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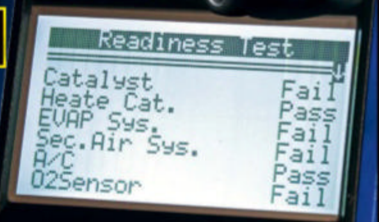

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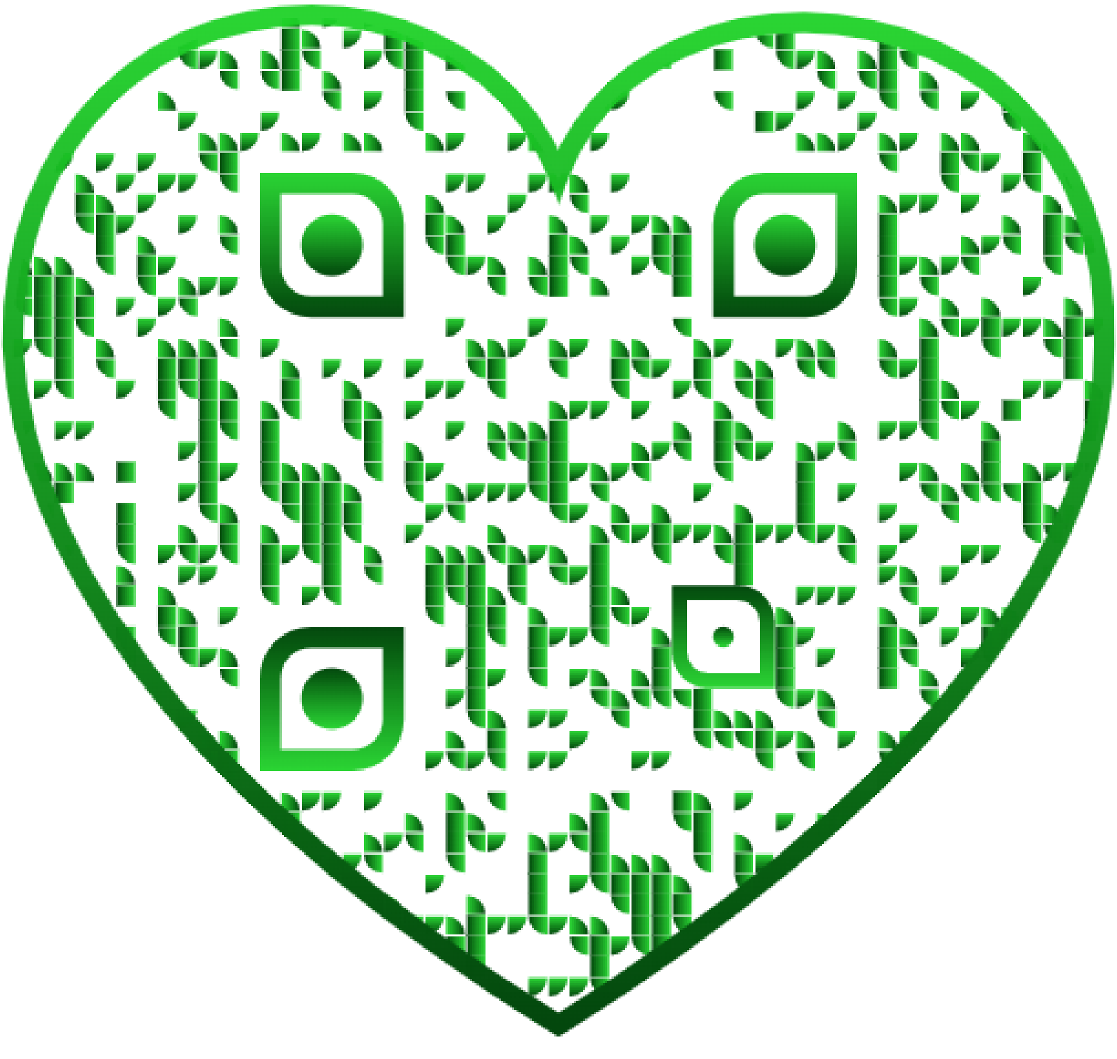

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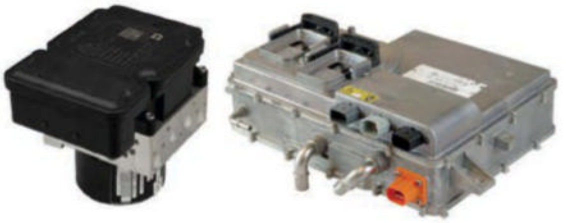

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Over the limit

I was seen driving over the speed limit last month. 37 in a 30mph zone. A mobile police van with a camera in the rear door was sitting on the side of a grass verge – and I was in an area that I've not visited for a while (about 15 miles from home).

Prior to this I was the first car at the traffic lights. When they turned Green, I turned left onto a B-road, through a right bend and then left onto a straight downhill section. I did reduce my speed on seeing the van, but it was too late.

Bizarrely, the van had parked about 200 metres before a set of traffic lights, which in all my time I've driven this road, the lights are more often than not 'Red' when approaching, so you're reducing speed here anyway.

I have been offered a driver awareness course, or points on my licence. A course is booked for September, the first available date I could get.

The very next day another letter arrived, this time from Kent Police. Oh no, not another speeding fine. This time, though, it was the ex-*CM* project Astra that is currently being used by a family member. She was seen doing 36 in a 30, so I had to inform her. Her first offence in 10+ years of driving!

It got me thinking about the older cars I drive and the newer car that my partner Sarah has, which is a Vauxhall Mokka. The older (cheaper) cars don't always have cruise control fitted, the Mokka does. In fact, it's adaptive cruise control. There's plenty of modern cars with this equipment fitted, but how many of us really use it? I've started warming to adaptive cruise in the Mokka – it works slightly better than Sarah's previous Toyota C-HR, which I found dangerous on the motorway.

I set the cruise radar to 'close' so that the car behaves more like a human. The Mokka then sits at a comfortable distance to the vehicle in front with the system activated. In fact, on a longer journey, I use the cruise control all the time now, setting the radar to 60mph, so that when we hit the National Speed Limit, the Mokka (it has an eight-speed autobox) gains speed according to the vehicle in front. I've become lazy and let the driver ahead of us do the driving – i.e. set cruise at the given speed limit, and when the speed changes from say 50 to 30, I'm not touching any pedals with my feet, just let the adaptive cruise do the work. Even approaching traffic lights, I don't brake. It's all rather spooky. The Mokka will sit in traffic at the lights for about five seconds, before the Stop-Start activates. You then have to take over to restart the journey, though can quickly setup the cruise again at a low speed (under 10mph) to 'resume' your original set speed.

Using the steering wheel mounted cruise buttons, it has become really easy to do this – older cars had a stalk usually placed behind the steering wheel.

So, today, I think the modern adaptive cruise is essential in being able to 'not' go over the set speed limit. Every little helps I guess. We don't have many 20mph zones in this area. Though, I've discovered that my manual diesel cars aren't happy in 3rd gear at 20mph – I have to drive in 2nd gear at over 2000rpm. Petrol engines are different; you can just about drive those in 3rd at 20.

Have you had a speeding fine this year? Judging by the in-demand driver awareness course booking slots, I consider the authorities are ramping up their observations.

MX-5 Project

I've had to abort the report on Part 5 of our Mazda MX-5 project this month. Sorry about that. Things didn't go to plan and the alloy wheel refurbishment was delayed, plus the new tyres I've ordered from Kumho also aren't here yet. I did wash the bodywork, jet wash the arches and as you can see above, created a flying MX-5 by placing it on four axle stands on the driveway, to remove all alloy wheels for refurbishment. The Mazda has sat like this for over a week now – my neighbours say nothing, they've seen it all before... The alloys are now ready for collection, but I've yet to see them – I asked the body shop to repaint them in a different colour to the original alloy – and gave them the opportunity to decide on a suitable colour to match a blue car!

Anyway, we will continue with the project in the next issue. I'm due to take it in next week to the MX5 Restorer guys for a new clutch and then full rustproofing, so I need to get the wheels back on asap – it's not going to fly down there, is it!

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We are sorry, but apart from material sent to *Help!* or *Diagnostics Doctor*, not all correspondence can be replied to personally, though everything is read carefully. Emails will be treated in the same way as ordinary mail – the editor is not normally available to provide instant replies.

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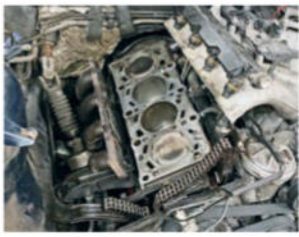

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The Peter Simpson COLUMN

Peter visits the Riley RM Centre, a car club parts operation which combines seamlessly professional operation with mutual-aid status.

▶ This past month, I've been getting a couple of issues sorted on the Riley RMB. One – a cracked exhaust manifold – has been present since I bought the Riley last year, but although a replacement manifold came with it, I hadn't quite got round to changing it. The other was an annoying issue which has arisen since April. Gradually, over a period of a month or so, the car become more and more reluctant to start from the starter button on the dash. Getting it to start generally involves opening the bonnet and pressing the button on the starter solenoid. On the RM this is mounted on the rear of the motor – and the motor and solenoid are effectively one part.

Anyway, with all other possible causes ruled out, the fault was traced to the starter solenoid itself; it wasn't quite pulling in far enough to engage due to general wear and tear. 1949 Riley RM starter motors aren't, of course, something the local motor factor keeps on the shelf or even can order in for next-day delivery. In fact, some RM parts started becoming difficult to obtain from the mid-1960s. Then, when they stopped making badge-engineered Rileys in 1969, British Leyland lost what little lingering interest in supplying parts for 'proper' Rileys they still had.

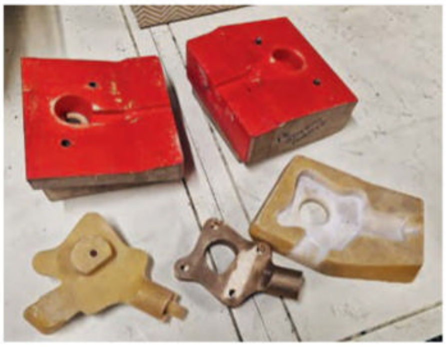
The Riley RM Club was started in 1969 as a means of ensuring that owners had ongoing access to parts, and while the club now does a lot more than just sell bits, the club parts operation remains a key aspect of the club 56 years on. All club members receive a comprehensive 36-page printed parts list from the club-owned Riley RM Centre Ltd., and thanks to the club's long-term commitment to keeping parts available and remanufacturing, there can't be much – if anything – that isn't available which owners need to keep a car roadworthy.

Some of the stuff that's been remanufactured is amazing. For example, half-shafts were something of a weak spot, but some years ago the club invest a hefty five-figure sum in having upgraded replacements remade.

Anyway, I needed a set of gaskets and studs for the manifold swap, and the starter motor had to be sent to the club for specialist rebuilding, and with it being a pretty hefty lump, that was going to cost a fair bit in carriage. So given that the club's parts 'warehouse' is only about an hour away, I decided to drive down and see the club parts operation for myself. Though 95% of parts are posted out (apparently, they send out 60-70 packages of parts every week), personal collection is possible by prior appointment. The parts catalogue does, however, warn that personal callers "may be given a task while you're here."

It's absolutely amazing! Forget any idea you might have of a club parts service being based on piles of grubby new-old-stock and second-hand items stored in lock-ups and supplied on a "I'll have a look for one when I'm next over there" basis. The Riley RM parts operation is totally professional – right down to the 'British Motor Heritage approved' certificates on display in reception. It also employs two full-time staff members in the shape of husband-and-wife team Steve and Karen Pettyfer.

Steve and Karen Pettyfer, who run the Riley RM Club's in-house spares operation.



Club owner tooling, used for casting Riley 1.5 engine thermostat housing mounts; these tend to corrode, and being unique to these engines, are available only because the club has arranged remanufacture.

Everything – Karen told me they have "around 250,000" individual parts in stock – is stored neatly on shelves and clearly labelled. And although the last car the club caters for was made in 1957, there's nothing remotely old-fashioned about the ordering and order fulfilment processes. Most parts orders come in electronically via the club's website (this is the preferred method of ordering), and while next-day delivery cannot be guaranteed, I know from direct personal experience that anything you order will arrive within 3-4 working days at most. Members can also phone in orders Monday to Friday between 3.00 and 4.30pm.

But what about the actual parts? Well, I may have missed the odd item, but during my visit I didn't see one single new-old-stock item; everything the club offers seemed to be newly remanufactured, to the highest quality. Much is made from scratch, including casting, and for things like 'rotating electricals' and shock absorbers the club provides service exchange components. As is often the case with service-exchange old parts however, the reducing supply of suitable core units for reconditioning is becoming a bit of a problem and in common with many parts specialists, the club now generally require your old part back before they will send out a replacement, even if said replacement is on the shelf.

Although the RM Centre runs at a profit in that parts are sold for slightly more than they cost, it remains a 100% mutual-aid organisation. There are no shareholders drawing any kind of dividend, and all profits after running costs are ploughed back into commissioning and supplying new lines. And because its only purpose is to ensure ongoing parts supply, the RM Centre is much less restricted by commercial considerations such as time-limits on recouping an initial investment. As Steve put it "if something is needed to keep our cars on the road, we can get it remade, even if it'll take over 20 years to get the initial investment back." Decisions on what to remake are made by a spares advisory panel in conjunction with the spares secretary.

There is, though, one other crucial difference between the Riley RM Centre and other spares businesses; the supply of parts is to club members only. This is enforced very strictly; all orders must be accompanied by a membership number. Members are also forbidden from reselling or redistributing club parts to non-members. This is perfectly reasonable; you can't expect to enjoy the key benefit of being a club member unless you are one!

Realistically, surviving numbers of Riley RMs are probably nowhere near enough to support a business that runs on purely commercial lines. But as an RM owner, I'm absolutely delighted that the club runs such a professional in-house service which is every bit as good as the commercial parts businesses that cater for more plentiful classics.

INSTANT EXPERT

TIMING CHAINS

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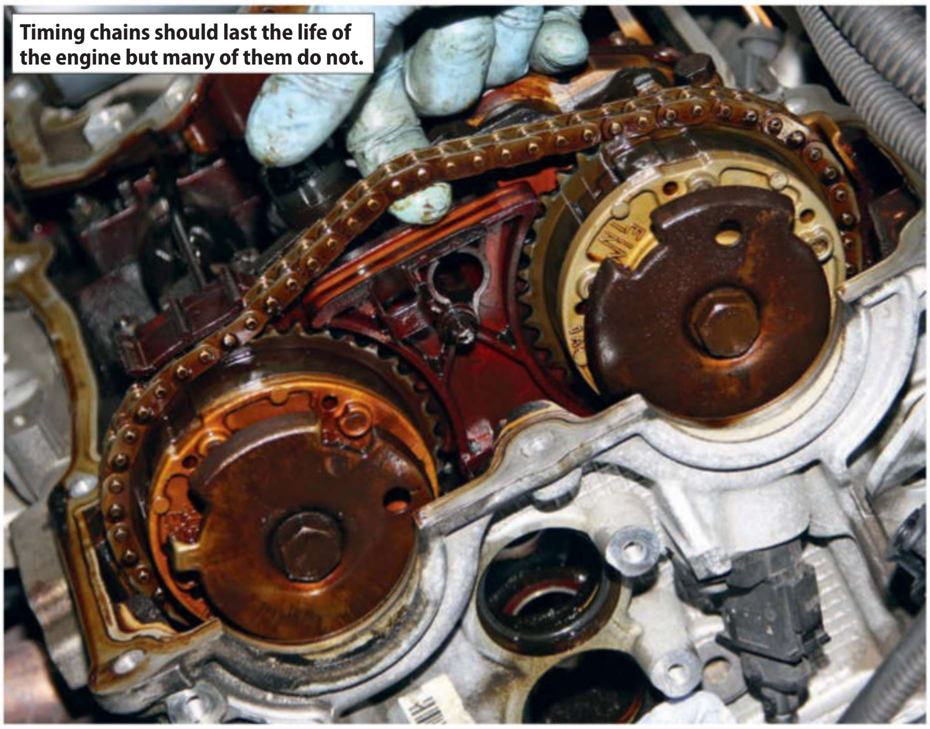
With a focus on modern timing chains, **Rob Marshall** looks at how they fail, before detailing the replacement procedure on a Jaguar Land Rover AJ200D four-cylinder diesel engine.

While many readers appreciate the serious mechanical destruction that tends to result, should the crank and camshafts become disconnected suddenly, we are hearing of an increasing number of timing chain failures. How can this be? Surely, they should last virtually forever – or, at least, that was the promise.



Timing chains should last the life of the engine but many of them do not.

Back to the future

Even in the black-and-white days of side-valve engines, timing chains were the main means of synchronising the crankshaft and camshaft, a methodology that continued, when overhead valve (OHV) engines gained popularity from the 1950s. As the camshafts were situated within the crankcase on these engines, chain lengths were relatively short. When overhead camshaft (OHC) engines saw the camshaft relocated from the engine block and into the cylinder-head, the chains became far longer. Keeping it tensioned and less prone to 'whipping' at higher speeds became a challenge. Even so, some manufacturers, BMW and Mercedes notably, stuck with chains. Many others, however, usurped the chain with a fibrous belt by the 1980s.

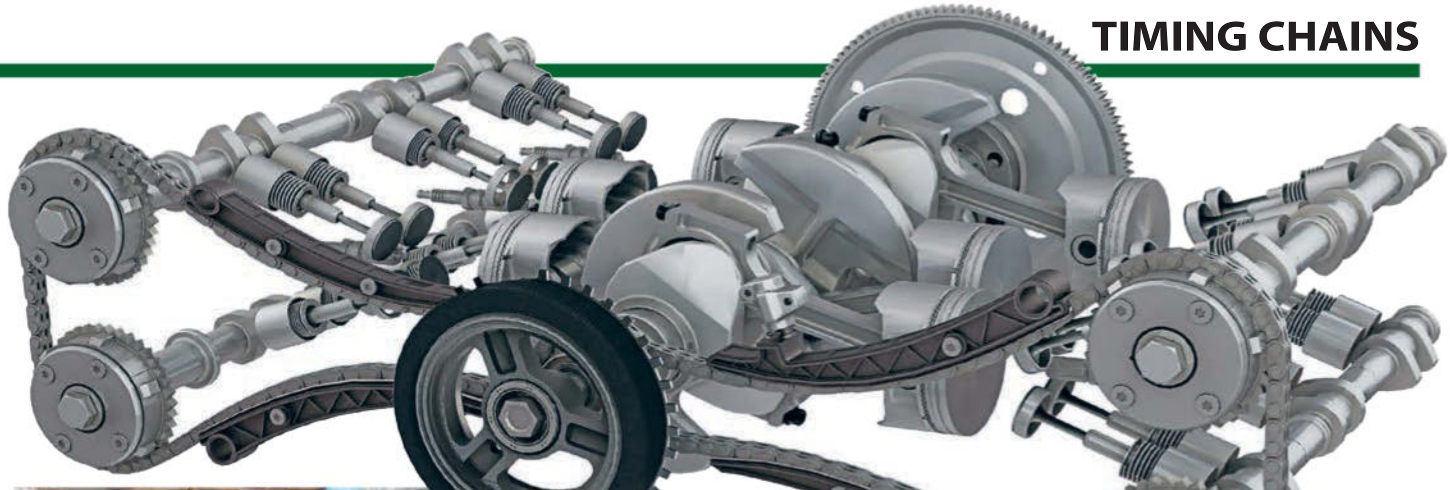
While the early days of timing belts caused carmaker warranty departments, owners, DIYers and garages a world of pain, they have developed into relatively reliable components. Unlike chains, belts are quieter, do not stretch/elongate, cost less for a manufacturer to install and their relatively lower mass means that they can rotate faster. Even so, even the finest timing belt drive requires periodic renewal as the car ages – an operation that adds a nasty sting to maintenance bills. A further problem is that they tend to give zero warning before they fail. By the time you hear a death rattle, it may well be too late for your engine.

Timing chains offer designers greater flexibility, too. As the engine does not need a separate timing cover, the engine can occupy less space within the engine bay. Intriguingly, this provides safety advantages. As timing chains can also reduce engine height, a greater distance between the bonnet and the cam cover can result, benefitting pedestrian safety.

Yet, a major reason why some car manufacturers migrated from belts back to chains was to appease the business fleet market, which still accounts for the majority of new car sales. By replacing the belt and its routine replacement interval with a seemingly everlasting chain, a carmaker could gain a competitive advantage on running costs. Today, over two-thirds of new combustion-powered cars are fitted with timing chains. The problem is that not only have some of them not lasted but their premature failure has ruined many an engine. If the car owner were lucky, the unexpected bill of timing chain replacement would be a fortuitous escape, compared with the cost of an engine rebuild.

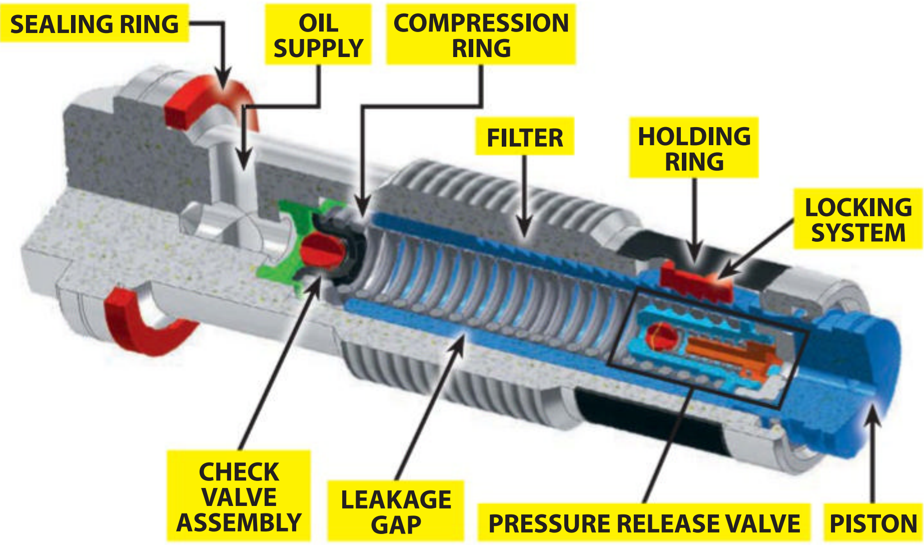
Why are modern timing chains failing?

The timing drive has to work considerably harder on modern engines. As they are OHC designs, not only is



Modern chain drives are so lengthy that extra parts are needed. All of these parts should be replaced together. While this Boxer flat-six engine is unusual, it shows clearly how long timing chain drives can be.

OHV/side-valve engines have shorter and less-stressed chain drives, compared with modern OHC designs.



Modern timing chains have more sophisticated hydraulic tensioners. Like the sprung metal tensioner, they can compensate for a degree of chain wear but unlike the spring tensioner, they have sound and vibration-deadening properties.

For many years, a simple spring-steel tensioner sufficed. This part has a significant wear groove, a wear characteristic that can be seen on worn modern tensioner rails.

the chain run far longer than the old side-valve/OHV applications but also they and must incorporate more complex designs and systems to keep the chain tensioned and running true. Where timing chains of the past used to run on just a pair of sprockets, modern power-plants can possess multiple camshafts in addition to fuel pump and balance shaft drives. Smaller displacement engines, Stop-Start systems (especially on hybrids), higher fuel injection pressures and variable valve timing place additional stresses on the timing chain.

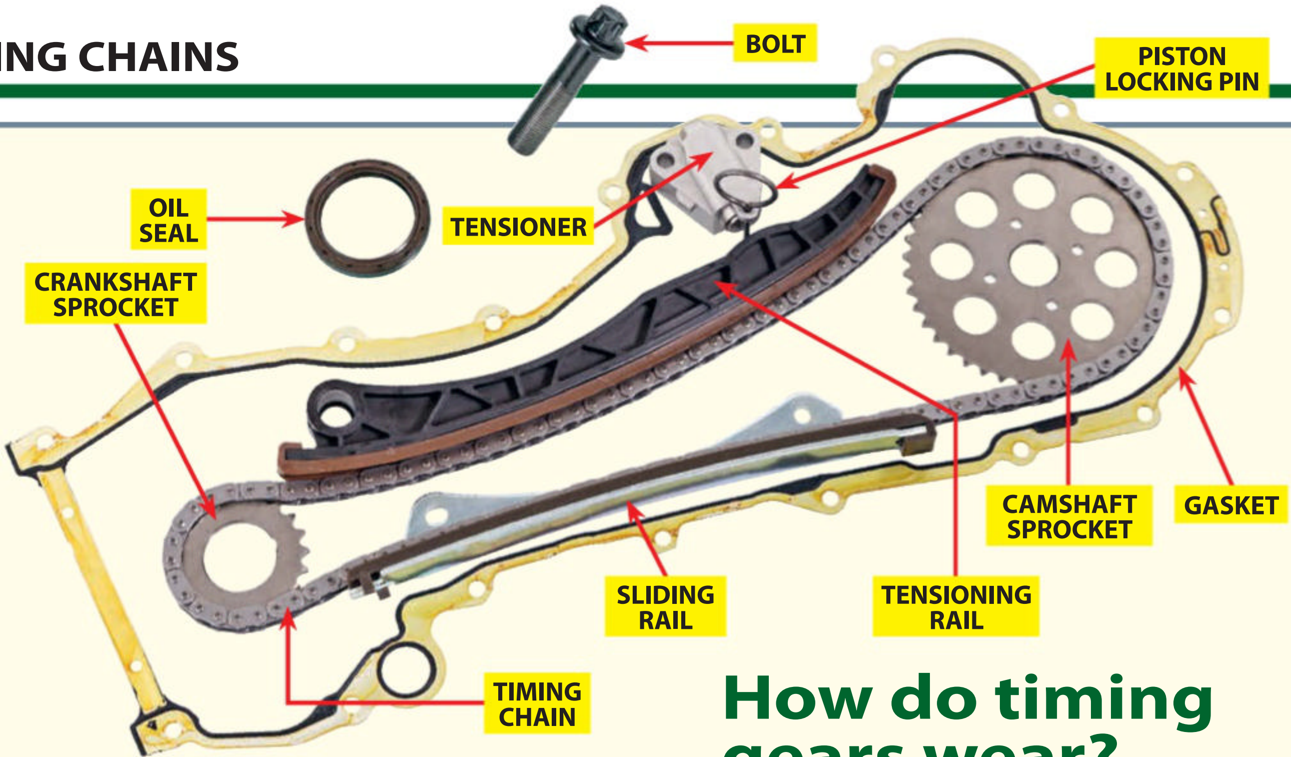
Environmental pressures are also responsible. As engine designers have to reduce engine friction and weight as much as possible to suppress carbon dioxide and fuel consumption, they cannot produce heavy and over-engineered timing chain systems.

Yet, the owner can be to blame. Skipping the already extended service intervals, or using incorrect oils, are examples of abuse that risk causing severe damage to the timing chain and its associated components.

JLR INGENIUM TIMING CHAIN REPLACEMENT PROCEDURE

▶ In the last issue's rebuild of a Jaguar Land Rover four-cylinder Ingenium 2.0-litre diesel engine, we identified timing chain failure as a common problem area. While JLR was unable to provide us with formal Technical Service Bulletins, an Internet search reveals not just anecdotal disgruntled owners but also specialist companies have questioned the chain drive design and the materials used.

Land Rover engine specialist, NWS Motor Services from Whitchurch, Shropshire, attributes the excessively-long 21,000/2-year oil drain intervals as a leading cause of timing chain failure. Instead, it recommends revised 10,000 miles, or annual intervals. While chain replacement can be conducted with the engine to the car, access can be very limited, dependent on the model. Therefore, the following guide covers the installation procedure on one of NWS Motor Services' remanufactured units for clarity. This means that we have not covered removing ancillary parts to access the chain drive. Finally, do not treat the quoted torque figures as gospel; verify that using data specific to your car.



How do timing gears wear?

THE CHAIN

Many people describe timing chain wear as 'stretch' but this is an inaccurate term. As its pins and bushes wear, the chain elongates. As it does so, the camshaft and crankshaft synchronisation becomes less accurate, which can trigger a fascia engine management warning lamp.

SPROCKETS

While sprockets might appear to be simple components, a considerable amount of engineering goes into them, especially those with double-sided hubs. The engine designer also decides on the optimum tooth pitch for optimum strength and longevity. The materials used are chosen carefully to maximise strength and minimise weight. To reduce CO_2 output and decrease noise, vibration and harshness, they can possess rubber coatings.

Sprockets tend to be fixed to the relevant shaft by either a keyway that locks it to a fixed position, or by friction on a tapered shaft, which lacks any alignment guides, making setting the timing more difficult. Most of them possess timing markers to aid with fitting accuracy, which are either coloured, or embossed into the material.

Sprockets wear on the chain contact areas, including the teeth. An excessively-worn sprocket upsets the camshaft/crank synchronisation and explains why chain kits include replacements.

SLIDING RAILS/GUIDES

Produced from a variety of materials, including plastic, aluminium and rubber, sliding rails guide the chain to the appropriate sprocket. To discourage the chain from moving side-to-side, they tend to possess inserts, made from plastic, or rubber, thus encasing the chain in a 'U' shaped profile. Sliding rails tend to be fixed but can be either straight, or curved, depending on the design of the timing system.

As with timing tensioner rails, the sliding rails can suffer from the effects of friction, when the metal chain cuts into the material, creating a groove.

TENSIONER

Modern timing chain systems tend to employ tensioners that use engine oil pressure to operate a piston that applies a pre-set force to the timing chain, preventing it from becoming excessively slack. Yet, it also damps vibrations created by the chain drive, a function that a spring-loaded tensioner does not perform. While some classic engine tensioners are nothing more than a curved piece of spring steel, non-hydraulic tensioners that rely on spring pressure tend to be used on less stressed areas, such as on the Front End Auxiliary Belt drive, which are not subject to the same stresses as those experienced by a timing chain system.

The tensioner must prevent the chain from becoming overly slack under all operating conditions and temperatures. Even when the components within the timing gear have reached their maximum wear tolerances, the tensioner must prevent the chain from becoming excessively loose.

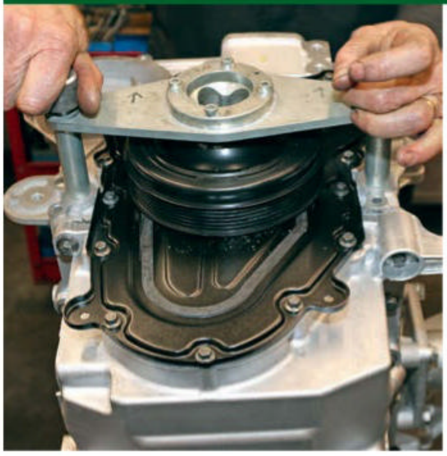
Tensioners weaken over time. Contamination from oil sludge reduces the operational oil pressure and, therefore the pressure exerted on the chain. Should they possess a rail, which bears against the moving chain, this can also wear.

TENSIONER RAILS

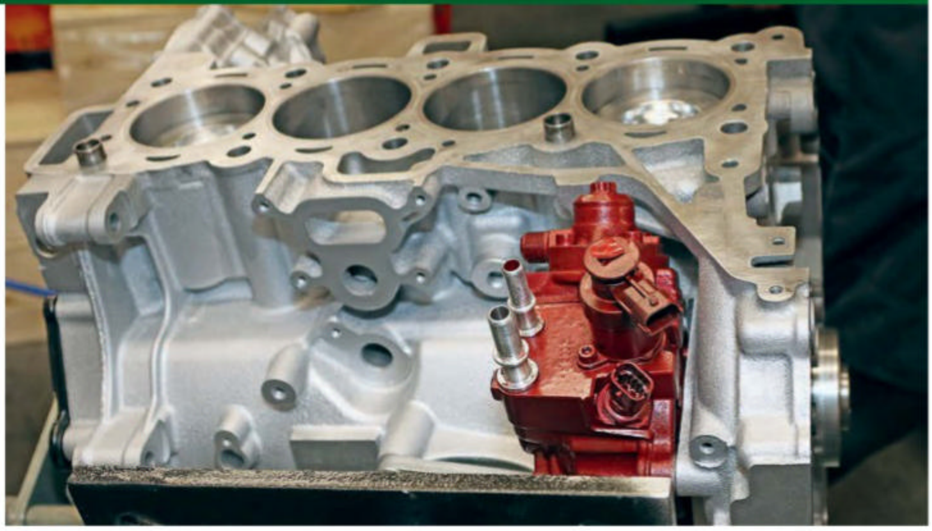
Tensioner rails are designed to guide the chain, while withstanding both chain friction and the pressure exerted against it by the tensioner. They tend to be pivoted at one end and their curved shape allows them to guide the chain, even when the system is at its maximum wear tolerance.

Manufacturers select tensioner rail materials carefully, for maximum efficiency, wear and quietness. While rails can possess aluminium, or glass-fibre, reinforced bases, tensioner rails may be made from plastic. Do not be worried about plastic parts being used, if they have caused no problems.

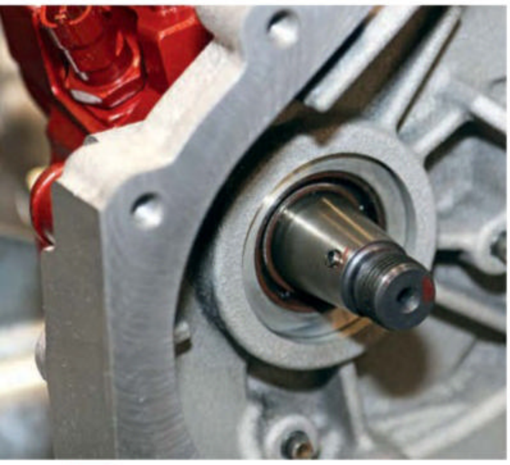
JLR INGENIUM TIMING CHAIN REPLACEMENT PROCEDURE



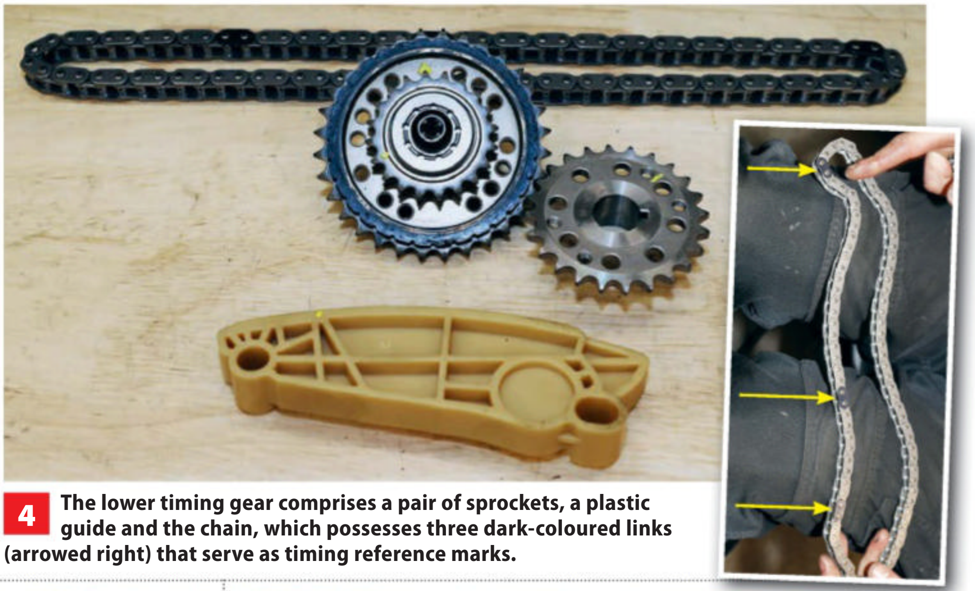
1 At this point in the reassembly process, the pistons, balance shafts, crankshaft, pulley and sump are installed and timed. There is no need to remove the cylinder-head to replace the two timing chain sets. The crankshaft is prevented from turning, using the shown JLR special tool JLR-303-1630.



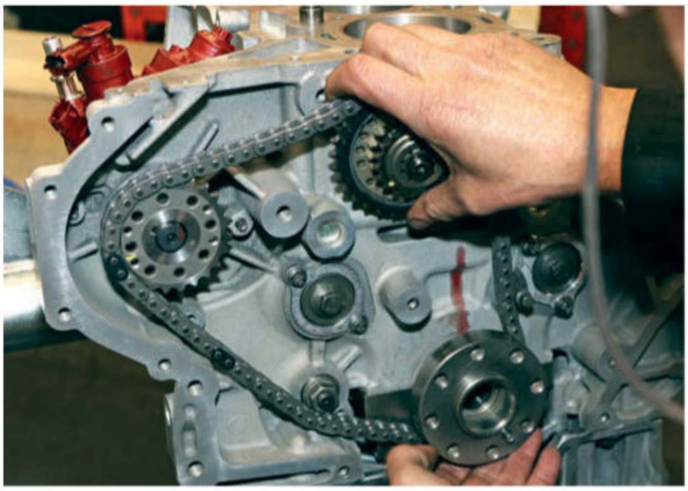
2 The timing gear is on the other side of the engine. NWS Motor Services fits a dummy fuel pump (painted red in this case) to facilitate timing gear assembly. Few (if any) engine remanufacturers will sell an engine with an expensive replacement pump. This Ingenium engine uses the popular Bosch CP4 unit, retained by three bolts.



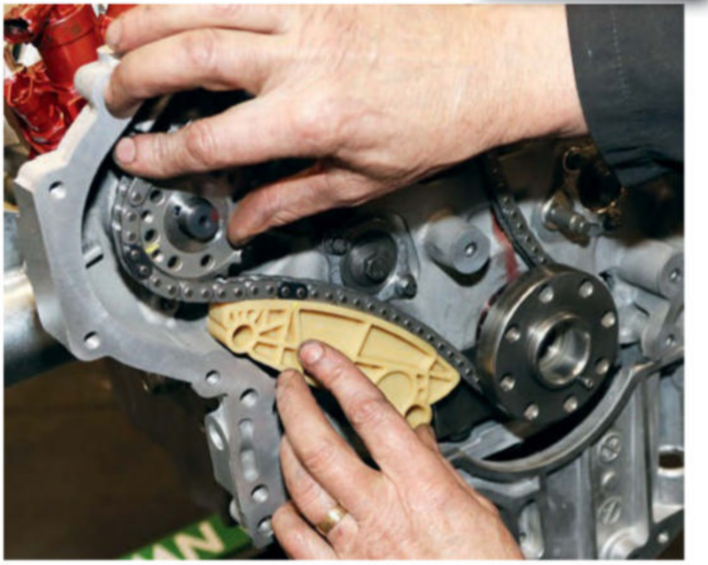
3 The pump shaft pin should point at, approximately, the 11 o'clock position, because the fuel pump sprocket cut-out is also at this position.



4 The lower timing gear comprises a pair of sprockets, a plastic guide and the chain, which possesses three dark-coloured links (arrowed right) that serve as timing reference marks.



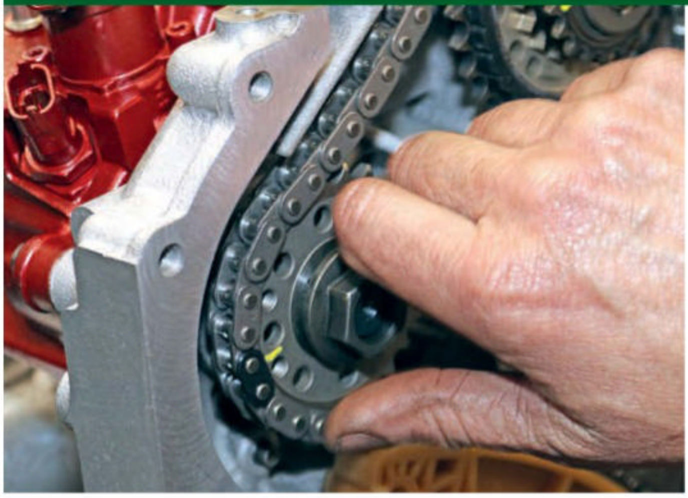
5 The timing gear is fitted, by hooking the chain over the bottom crankshaft sprocket, which forms part of the crankshaft and cannot be dismounted. The kit's fuel pump sprocket mounts onto the pump nose, secured by the keyway and the upper double sprocket mounts onto the crankcase.



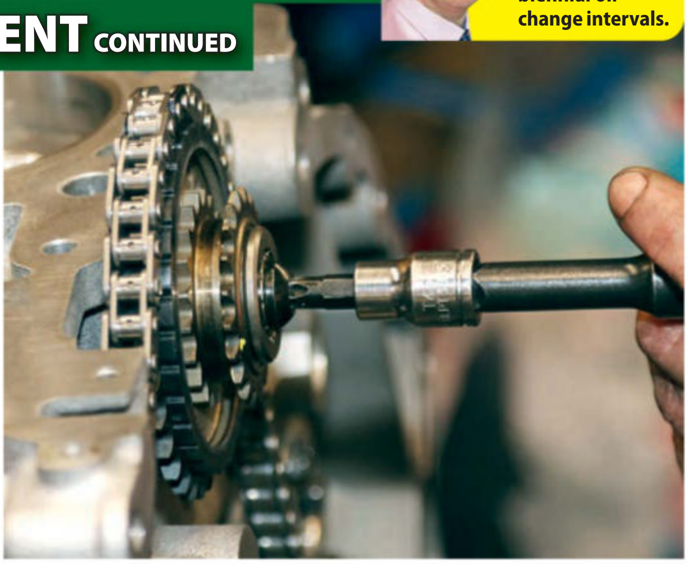
6 The plastic guide is fitted and retained by two T45 bolts, tightened to 25Nm.

ROB'S TOP TIP
Consider halving biennial oil change intervals.

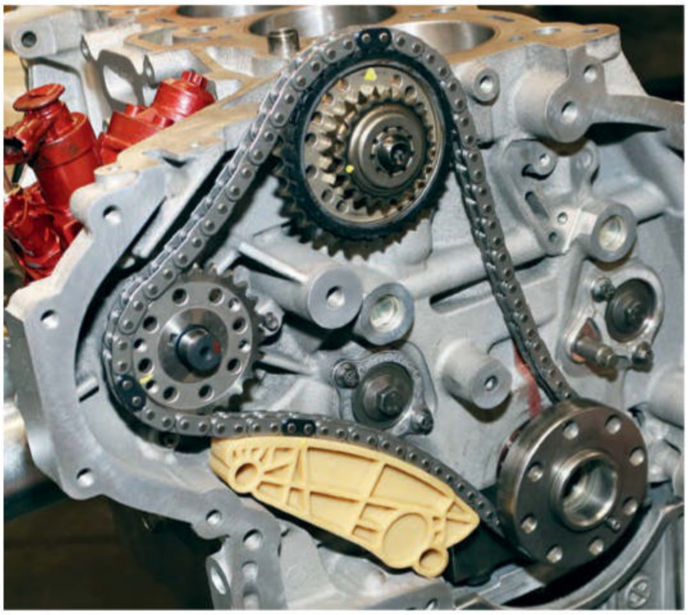
JLR TIMING CHAIN REPLACEMENT CONTINUED



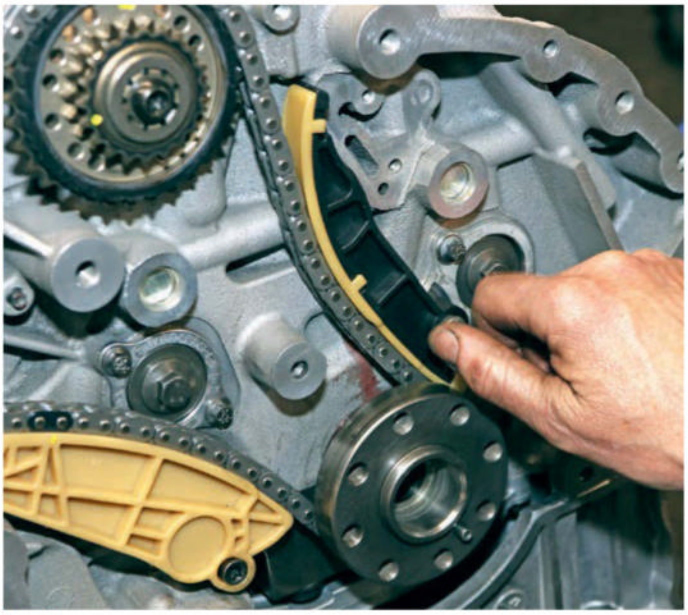
7 As this fuel pump is a dummy assembly, the sprocket bolt is secured temporarily to facilitate chain installation.



8 The T45 bolt that secures the top (idler) double sprocket requires 35Nm.



9 Note that the dark chain links align with the punch marks on the sprockets' guide. For clarity, these punch marks have been highlighted in yellow paint.



10 The tensioner does not bear directly against the chain. Instead, it utilises a tensioner rail, which requires its 8mm nut to be tightened to 12Nm.

Focus on lubrication

▶ As the timing chain is lubricated continually by engine oil, in theory, it should never wear. Yet, increasingly lengthy service intervals may cause the engine oil to degrade well before it is drained. Should the engine oil not be changed regularly enough, the acidic sooty contaminations attack the chain not just by abrasion but also chemically. Additionally, unburnt hydrocarbons can become deposited in the minute holes within the tensioners, resulting in a lack of oil pressure and the chain running slack.

Incorrect oil is also a problem. Excessively thick oil will not protect the chain sufficiently. Should the tensioner depend on oil pressure to work, a too viscous oil will cause the chain to run slack and increase the risk of jumping a sprocket tooth. Oil that is too thin will also affect the chain tensioning.

Yet, there is far more to using the correct oil than viscosity; you must ensure that the specification is correct. It is most interesting that European and North American specifications have been revised to include extra additives for timing chain protection, which might indicate that prior formulations were inadequate. While oils that meet ACEA C6 and/or API SP have to pass a timing chain elongation test, it is best to ensure that any oil you use meets the manufacturer's specifications. Your handbook should contain further details – but check with your dealer to see if the handbook recommendation has been superseded.

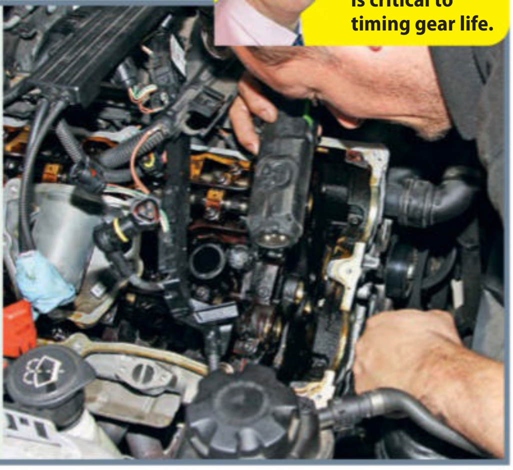
ROB'S TOP TIP

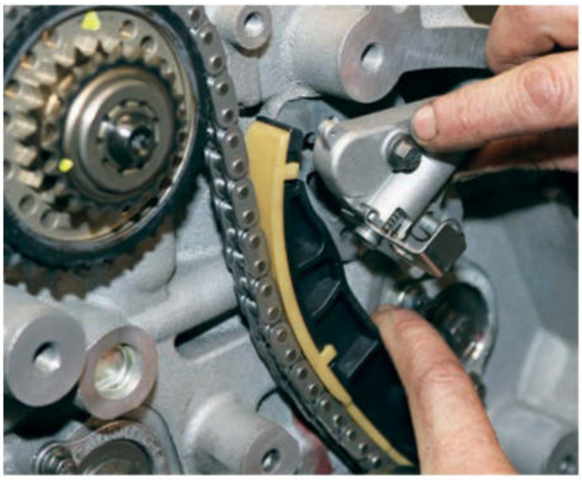
Oil quality is critical to timing gear life.

How do you detect timing chain wear?

While modern timing chains tend not to last the life of the engine, at least they tend to give some warning of impending failure, unlike timing belts. Noise is the main clue, especially a rattling sound. Accessing the EOBD socket with a diagnostic sensor might reveal a cam/crank correlation issue, which may point to a timing chain elongation situation, or a lack of adequate tensioning. The resultant code may indicate a cam/crank synchronisation problem, such as P0016. A lack of accurate inlet and exhaust valve timing is likely to trigger other fault codes, because, invariably, the result will be increased exhaust emissions.

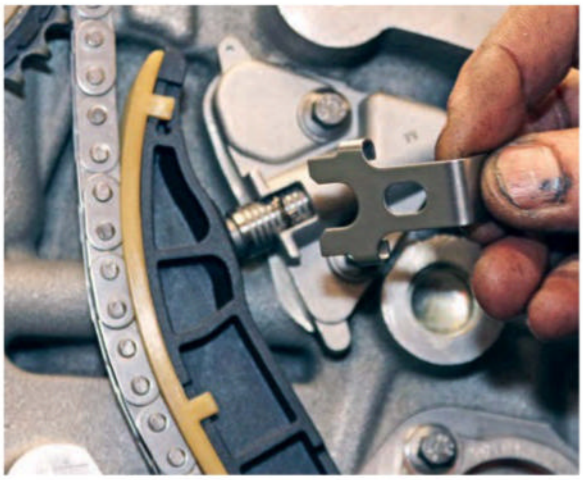
When the engine is dismantled, typical clues involve tensioners that are extended fully, an obviously slack chain, grooves worn into the rails and damaged sprockets. When replacing a chain, never replace the chain alone. Invest in a kit of parts, otherwise the replacement chain will fail quickly, risking taking the engine with it.

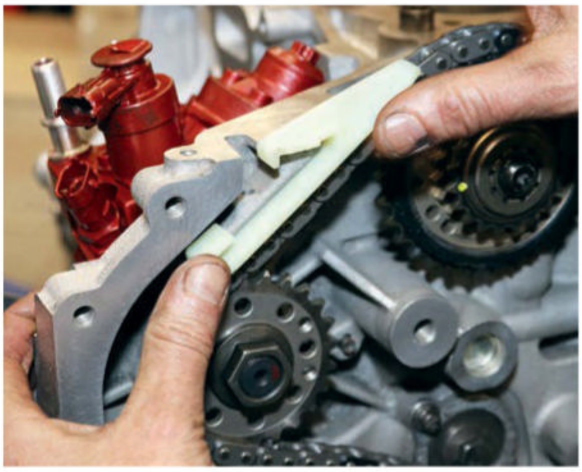




11 Once the rail is installed, the tensioner is fitted. It is retained by a pair of 8mm bolts that should not be tightened more than 12Nm.

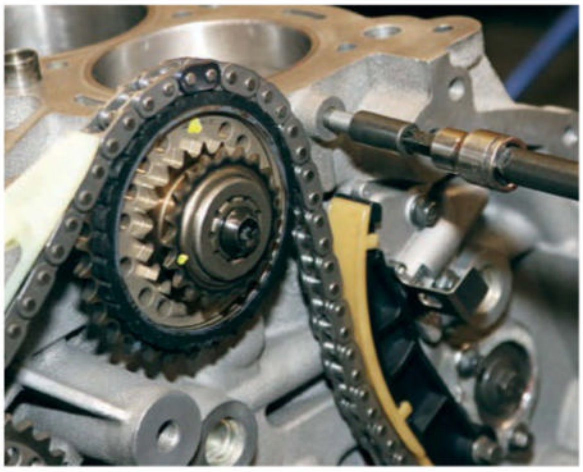
12 Once the retaining clip is removed, the tensioner's piston will apply force to the tensioner rail, which bears evenly against the chain.

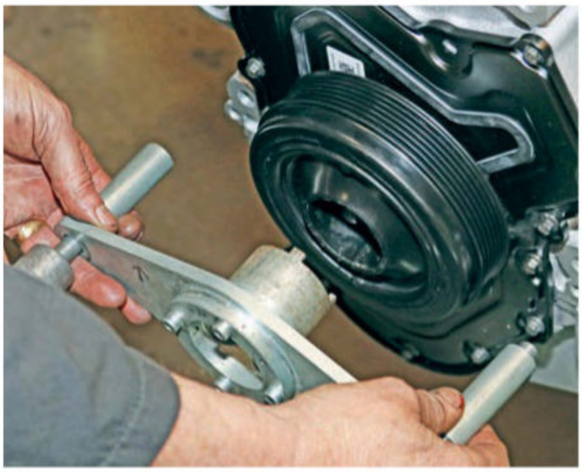




13 It is easy to omit the top plastic guide, which clips into the crankcase casting, above the fuel pump sprocket.

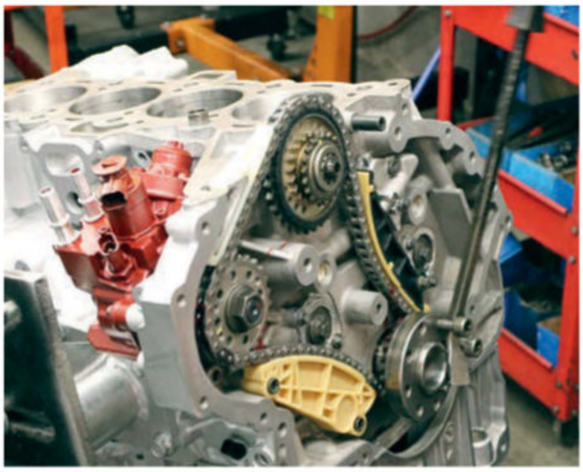
14 As the cylinder-head (and so, by association, the camshafts) are not fitted yet, the upper chain guide dowel must be installed, with its T45 bolt, which requires 25Nm.





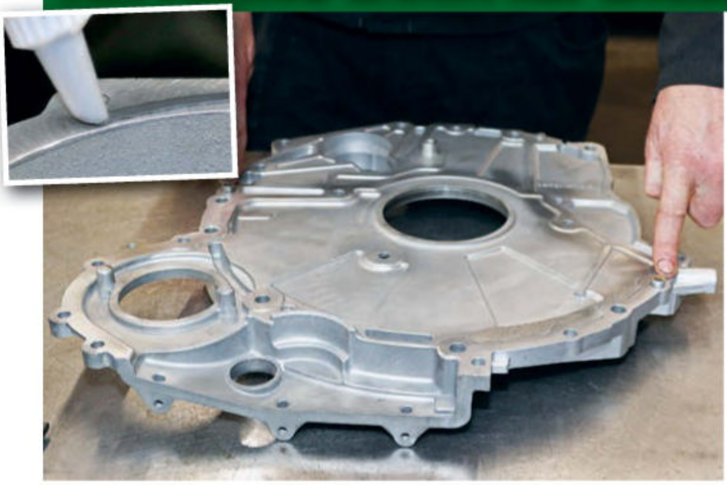
15 Once the timing chain and guides have been treated with assembly lube, the crankshaft locking tool (fitted in Step 1) can be dismounted.

16 The engine is rotated 15 times, before it is verified that the timing marks return to their original positions, as per Step 9.

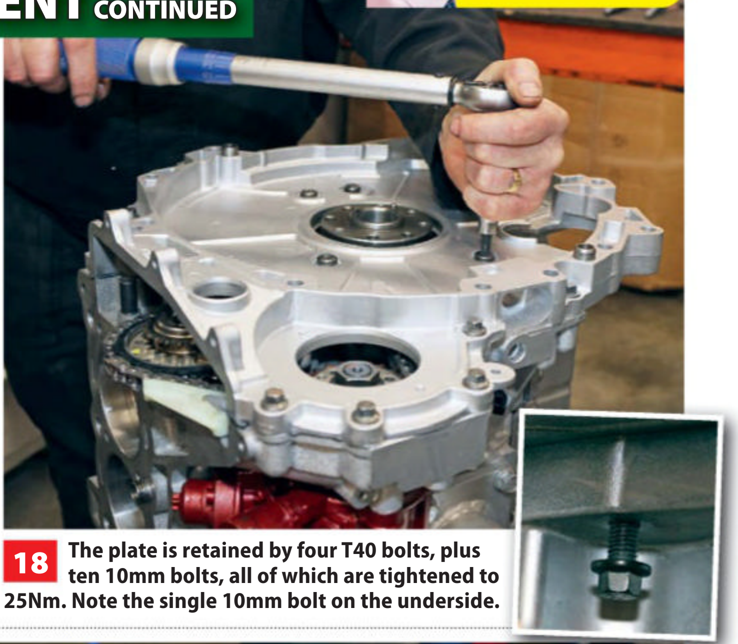


ROB'S TOP TIP
Change timing chains as a kit, not individual parts.

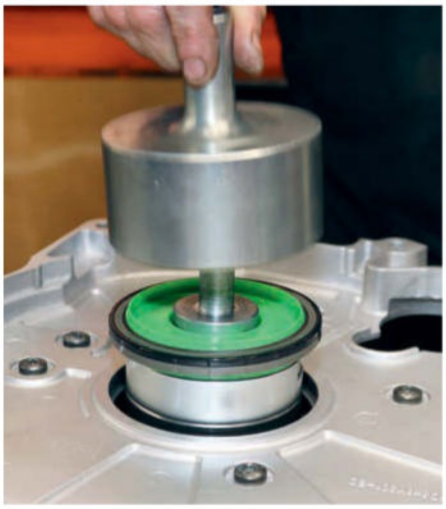
JLR TIMING CHAIN REPLACEMENT CONTINUED



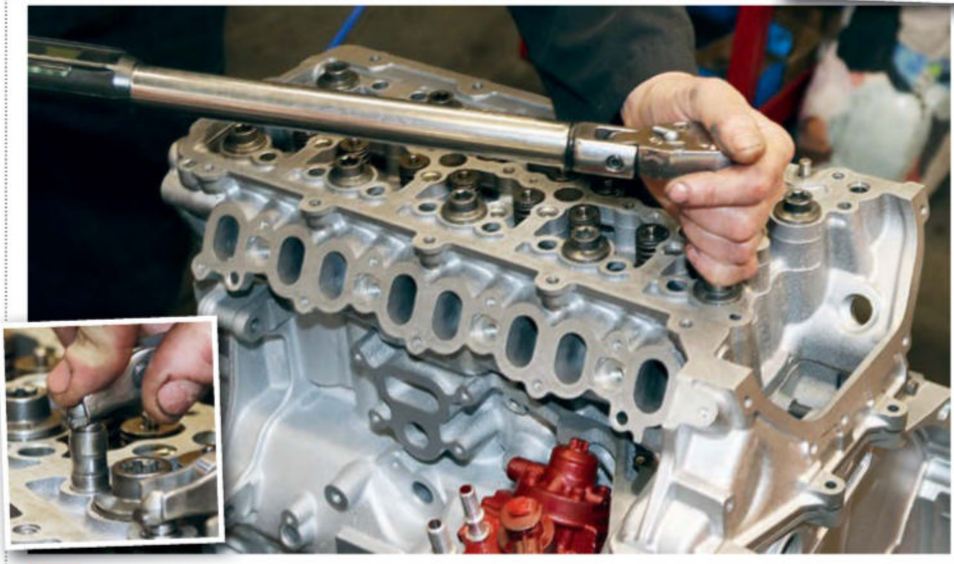
17 The rear engine cover is a large aluminium casing that would have required removal to gain access to the timing gear. A pair of steel dowels ensures accurate fitting to the engine block. No gasket is used; both mating surfaces require a light bead of JLR flange sealant.



18 The plate is retained by four T40 bolts, plus ten 10mm bolts, all of which are tightened to 25Nm. Note the single 10mm bolt on the underside.



19 The rear crankshaft oil seal requires a special tool to press it into position, without distorting it. As with any crankshaft oil seal, its lip needs coating with clean engine oil prior to installation.



20 As detailed last issue, the cylinder-head is in two halves. For clarity, the cylinder-head does not require removing to renew the timing gear. This is the lower section being fitted. The rockers (pictured inset) tend to break, if the timing chains fail and the pistons strike the valves.

From whom should I buy replacement parts?

▶ As with every other stressed and safety-critical component, you must insist on OE quality from whomever you buy parts. This means that the parts must be of the same quality, at least, to those installed at the car factory. Be wary of counterfeit parts, too, which tend to be more prolific on online marketplaces. The German bilstein group's brand, febi, provides almost 300 timing chain kits, covering 97% of European and Asian brands. The firm insists on OE quality and highlights not only its relationship with companies that supply the car manufacturers but also its production site in Ennepetal. Its in-house quality management system includes all of its chains complying with ISO9002 and febi developing a test bench on which all of its hydraulic chain tensioners are tested.

As with other motorcar components that may indicate higher-than-expected wear levels, you can expect the original parts to be upgraded. Car manufacturers also do this but tend not to provide many details about it – except to replace the original part number with another one. Quality aftermarket suppliers do the same, too. For instance, febi offers a special coating that counteracts wear that is caused by contaminated oil. TRITAN®-Coating is a special surface treatment, applied to the chain bolts, which reduce friction by around 20%. The result is that the rate of chain elongation is reduced by 50%, thus doubling the chain's lifespan.

Top 5 timing chain replacement tips:

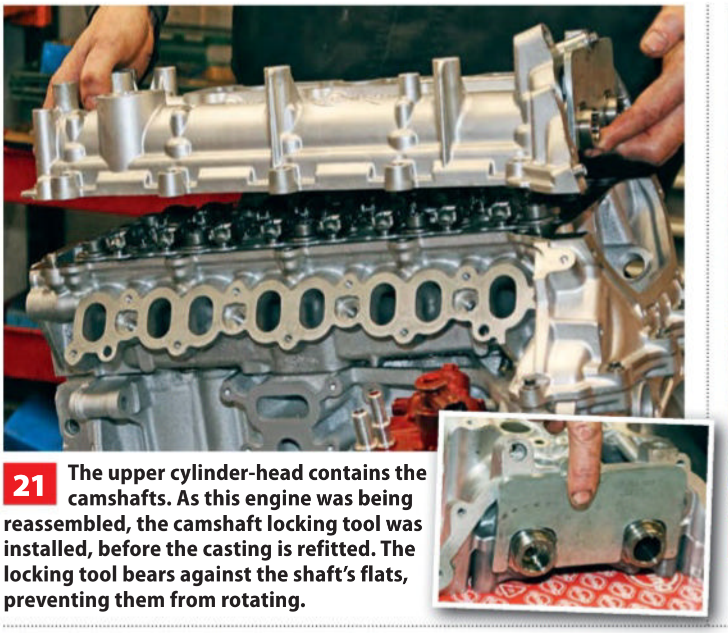
ENSURE AN ACCURATE DIAGNOSIS: Is your engine suffering from an expensive timing chain problem, or is the noise coming from the FEAD drive, or air-conditioning compressor, for instance?

CHECK DATA: Ensure you feel confident tackling the chain replacement procedure, before starting to dismantle the engine.

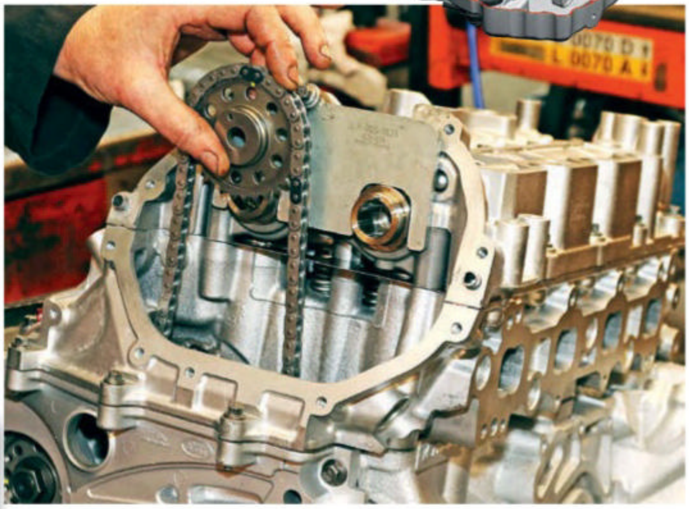
TOOLS: Have you all the tools needed? Some engines require special tools.

PARTS: Ensure you renew the whole chain kit, not the chain alone. Use good quality components that comply, at least, with OE quality.

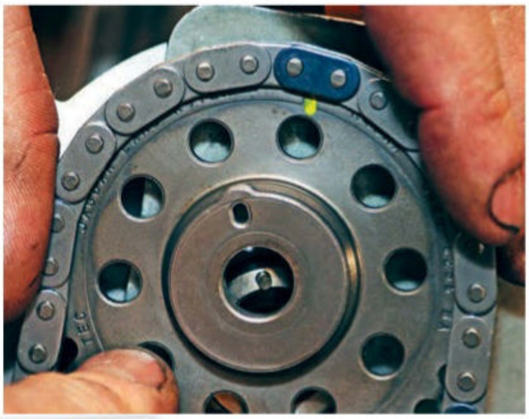
SERVICING: Never underestimate how the correct specification oil, changed on time, affects timing chain life.



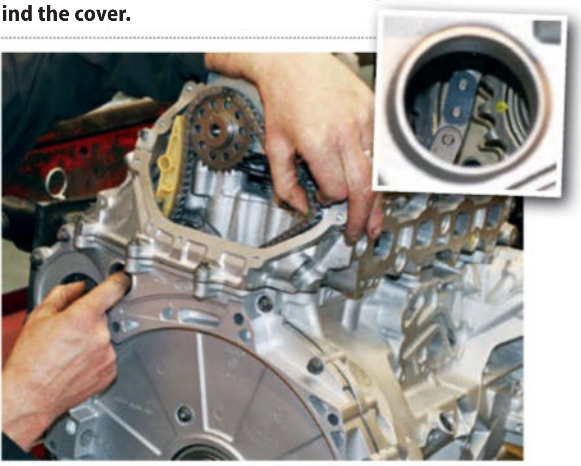
21 The upper cylinder-head contains the camshafts. As this engine was being reassembled, the camshaft locking tool was installed, before the casting is refitted. The locking tool bears against the shaft's flats, preventing them from rotating.



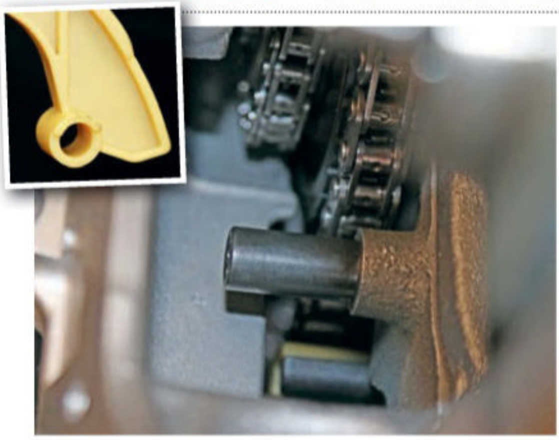
22 Refit the crankshaft locking tool (Step 1). The upper timing chain is lowered into the engine cover, where it engages with the second set of teeth on the double sprocket from Step 8, which is now located behind the cover.



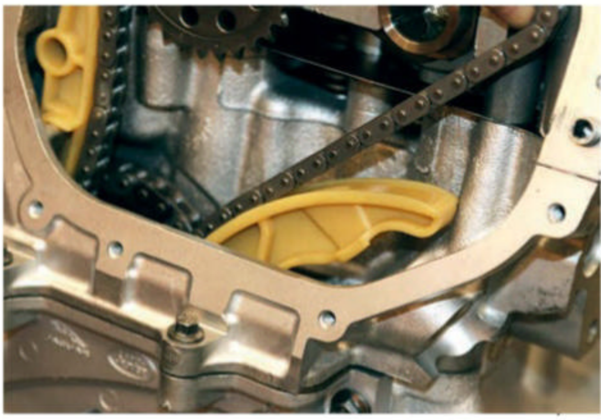
23 ◀ The sprocket is mounted onto the inlet camshaft end, retained in place by the dowel. Should this dowel be broken, the sprocket would spin unimpeded on the shaft. Note that the timing marks between the sprocket and chain should align, as per Step 28.



24 ▶ The left-hand upper chain guide is installed, as pictured using the gap at the top and working through the access hole. The dark link should align with the mark on the double sprocket, as viewed through the timing hole provided in the cover.

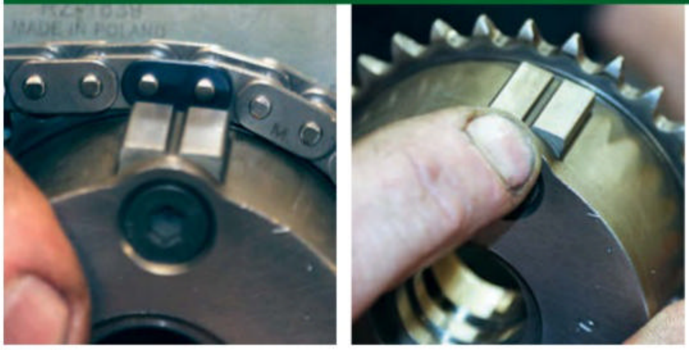


25 ◀ The chain tensioner rail's bottom mount pivots on the dowel, pictured in Step 14. The dowel is pictured again, looking down into the engine through the cover. The securing bolt requires 25Nm.

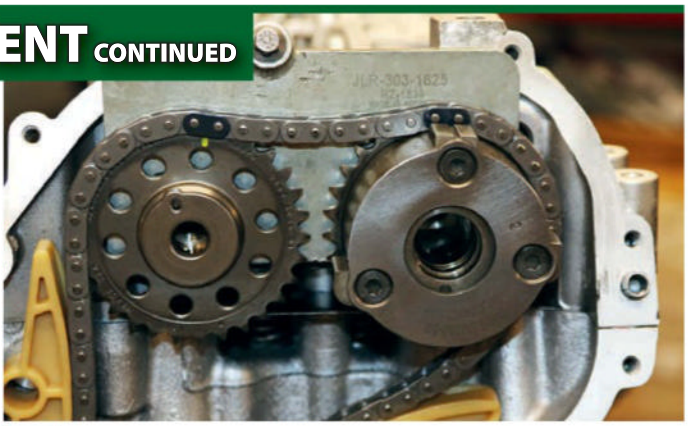


26 ▶ This is how the tensioner rail should look, once fitted. Obviously, it is not exerting any force on the chain, until the tensioner is fitted.

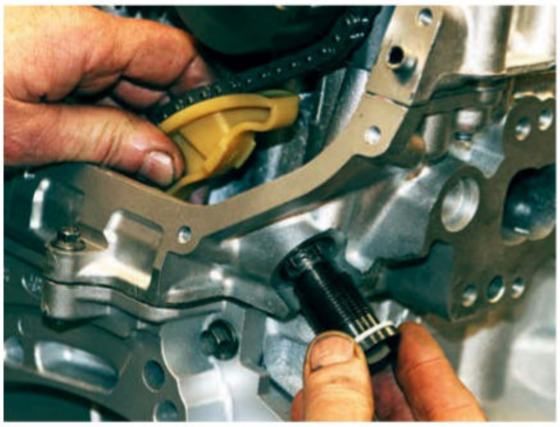
JLR TIMING CHAIN REPLACEMENT CONTINUED



27 Before that can be done, the exhaust sprocket should be fitted. Note that the keyway at the top should align with the dark chain link.

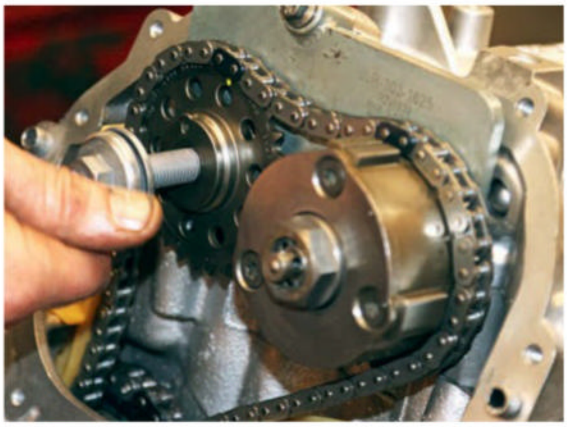


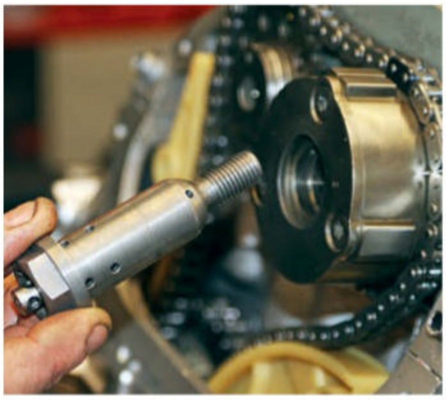
28 You confirm that the upper chain is timed correctly, by verifying that the marks on the sprockets align with the dark-coloured chain links. This is how they should look.



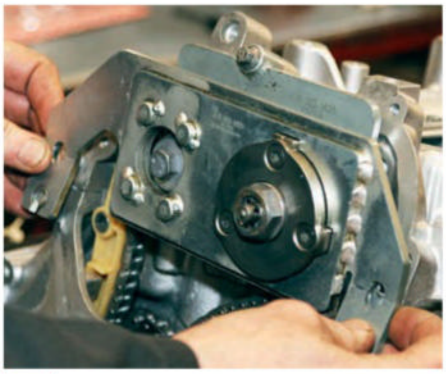
29 ◀ Install the timing chain tensioner so that the tensioner rail bears against the chain. It can then be tightened to 55Nm. Remove the locking pin, so the piston applies pressure to the rail.

30 ▶ The intake sprocket is retained by a single-use bolt that is tightened to 80Nm plus 90°. Never reuse the old camshaft sprocket fixings.

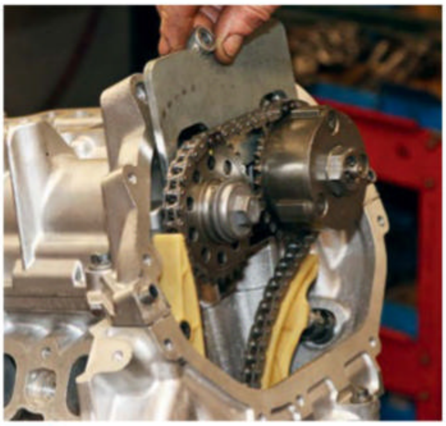




31 The exhaust cam features variable valve timing; note how the bolt shaft is hollow and features oilways. Its torque setting differs from that of the inlet, being 25Nm plus 40°.



32 To avoid damaging the locking tool, moving the camshafts and snapping the intake sprocket's dowel, as you tighten the bolts, you will need to fit another special Jaguar Land Rover tool (JLR 303-1631). This fits over the sprockets and bolts to the cylinder-head.



33 Check again that all the timing marks align. Dismount all locking tools from the cam and crankshafts and apply assembly lubricant to the chain.

Which cars suffer from timing chain failure the most?

▶ This is not an easy question to answer, due simply to statistics. It is possible that a low-volume car model has severe timing chain problems but more timing chain kits are sold for a more popular engine, due simply to the higher numbers on the road. febi revealed its most popular kits are used on engines powering multiple models. Based on motor factor sales, the highest figures are:

1 **Vauxhall/Opel Astra** (2004>2011), **Corsa** (2000>2014) – **part number 49689**.

2 **Volkswagen Polo 5** (2009>2022), **SEAT Ibiza IV** (2008>2015), **Skoda Fabia** (2006>2014) – **part number 174469**.

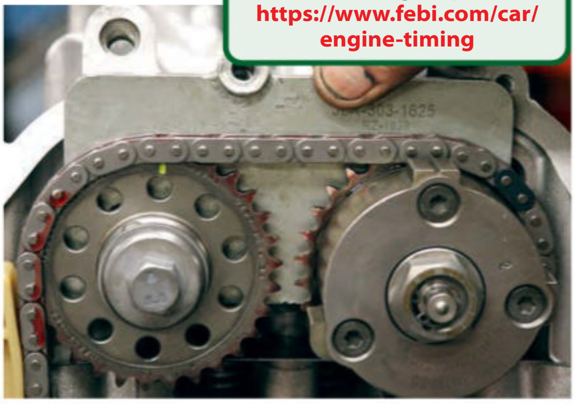
3 **BMW 1-Series, 3-Series** (2011>2019), **MINI Cooper** (2006>), **MINI One** (2010>2013) – **part number 171910**.

4 **Fiat 500 IV** (2007>), **Ford Ka II** (2008>), **Suzuki Swift III** (2005>2012), **Vauxhall Corsa** (2014>) – **part number 49722**.

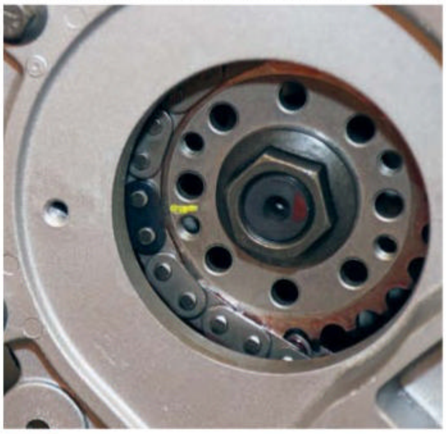
5 **Jaguar F-PACE, XE, XF** (2015>), **Land Rover Discovery** (2016>), **Range Rover Evoque** (2011>), **Range Rover Velar** (2017>) – **part number 194091**.

34 ◀ Rotate the crankshaft through 30 revolutions.

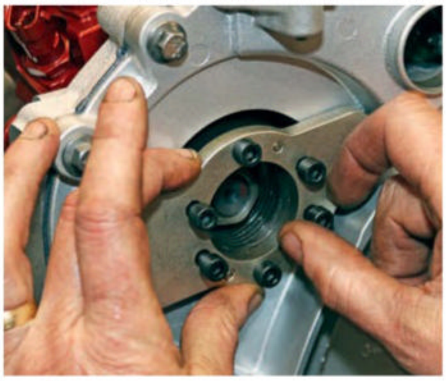
35 ▶ Once complete, refit the camshaft locking tool. It should slot easily into position. Note that the timing marks no longer align – this is normal.



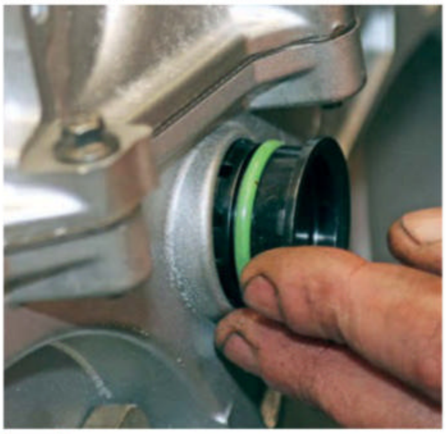
THANKS TO
The bilstein group (febi)
https://www.febi.com/car/engine-timing



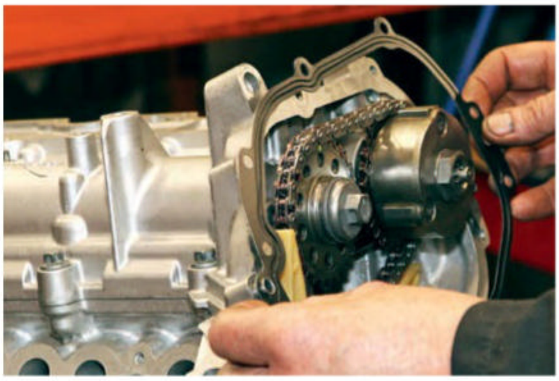
36 Yet, the fuel pump sprocket's timing mark should align with the dark chain link. This will confirm that the engine is timed correctly.



37 As fuel pumps are not supplied with remanufactured engines, NWS Motor Services fit a bracket that maintains the timing chain timing but allows them to remove the fuel pump. Their customer can then install the original fuel pump.

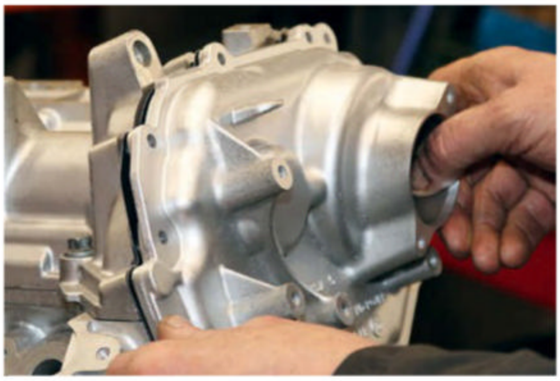


38 A replacement timing window bung is replaced, with a new O-ring. NWS Motor Services advises that this is a common oil leak area, so resist using the old one.



39 ◀ The upper timing chain cover possesses a metal gasket. Using the old part is a false economy. NWS Motor Services recommends applying a thin smear of jointing compound between the upper and lower cover mating surfaces to keep them oil-tight.

40 ▶ The cover is retained by 11 8mm bolts, which should be tightened evenly to 12Nm.

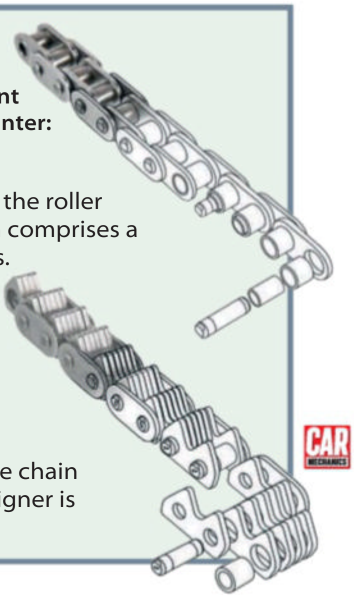


Different types of timing chains

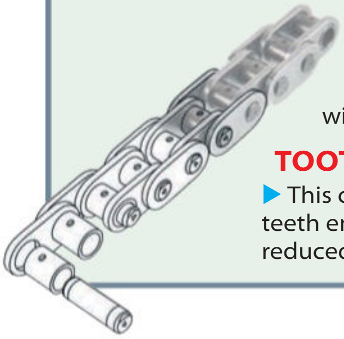
▶ There is more to timing chains themselves than meets the eye. Engine manufacturers select different chain types, depending on their requirements. These are the three most popular types you will encounter:

ROLLER CHAIN

▶ Offering an ideal blend of strength, long life and good noise, vibration and harshness properties, the roller chain is the most popular type of chain used on engine timing drives. The inner link of a roller chain comprises a pair of inner lobes, two sleeves pressed into the link eyes, and two rollers rotating above the sleeves.



BUSH CHAIN



◀ You tend to find bush chains used in high-revving diesel engines. Bush chains dispense the two rollers, meaning that the sleeves engage directly with the sprocket. This gives them a larger joint surface than roller chains.

TOOTHED CHAIN

▶ This chain design possesses a different structure from bush and roller chains. The chain teeth engage with those on the sprockets, the main advantage for the engine designer is reduced noise in operation.

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Model	Dims	Order Code	exc.VAT	WAS inc.VAT	inc.VAT
CIG81212	3.6 x 3.6 x 2.5m	140613584	£239.98	£298.80	£287.98
CIG81015	4.5 x 3 x 2.4m	140613570	£276.00	£334.80	£331.20
CIG81216	4.9 x 3.7 x 2.5m	140613574	£315.00	£382.80	£378.00
CIG81020	6.1 x 3 x 2.4m	140613572	£345.00	£418.80	£414.00
CIG81220	6.1 x 3.7 x 2.5m	140613576	£385.00	£466.80	£462.00
CIG81224	7.3 x 3.7 x 2.5m	140613578	£479.00	£586.80	£574.80
CIG1432	9.7x4.3x3.65m	140613594	£1079.00	£1318.80	£1294.80
CIG1640	12x4.9x4.3m	140613596	£2398.00	£3118.80	£2877.60

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3
1
2
BALL BEARING

Model	Description	Order Code	exc.VAT	inc.VAT
1 CBB209C ‡	9 Dr Chest	070118032	£149.98	£179.98
2 CBB217C	7 Dr Cabinet	070118057	£279.00	£334.80
3 CTC1300C	13 Dr Combi	070113042	£189.98	£227.98

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JS1224

JS4000

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Model	Starts Engines up to	Peak Amps	Order Code	exc.VAT	inc.VAT
JS1100C	3L	1100	010310015	£96.99	£116.39
JS1224LiN	6L	1200	010318905	£144.99	£173.99
JS4000	6L	2200	010311030	£164.99	£197.99
JS1224	6L	2000	010311224	£179.98	£215.98

ALUMINIUM RACING JACKS

Clarke RACING

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- Quick lift
- Non-marking nylon wheels

CTJ1250AC

Model	Lifting Cap.	Order Code	exc.VAT	WAS exc.VAT	inc.VAT
CTJ1500QL	1.5T	020112633	£104.99	-	£125.99
CTJ1250AC	1.25T	020111818	£125.99	£155.98	£151.19
CTJ2500QLGB	2.5T	020112803	£159.98	£203.98	£191.98
CTJ1800AB	1.8T	020113202	£189.98	£233.99	£227.98

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- Superb range ideal for DIY, hobby & semi-professional use

TIGER 8/260

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Model	Motor	Tank	Order Code	exc.VAT	WAS inc.VAT	inc.VAT
8/260	2HP	24L	000119490	£104.99	£129.59	£125.99
11/550	2.5HP	50L	000119505	£159.98	£203.98	£191.98
16/550	3HP	50L	000119510	£229.98	£286.80	£275.98
16/1050	3HP	100L	000119515	£289.98	£358.80	£347.98

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◆ WAS £634.80 inc.VAT ● WAS £1138.80 inc.VAT

Model	Volts	KVA	HP	Order Code	exc.VAT	inc.VAT
PG2500A	230	2.2	5.6	010617850	£219.00	£262.80
PG3800A	230	3	5.6	010617852	£249.00	£298.80
PG3800ADV ‡	230/110	3	5.6	010617854	£269.00	£322.80
PG6500ADVES◆	230/110	5.5	9.7	010617856	£519.00	£622.80
PG9000ADVES●	230/110	5.5	16	010617860	£895.00	£1074.00

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2 KVA

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‡ WAS £1078.80 inc.VAT
◆ WAS £2230.80 inc.VAT

Model	Max Output	Weight KG	Order Code	exc.VAT	inc.VAT
IG1700F	1700W	22	010617095	£249.00	£298.80
IG1100	1050W	13.4	010611103	£279.00	£334.80
IG1900	2000W	20	010617117	£329.00	£394.80
IG2300	2200W	21	010612302	£389.00	£466.80
IG4000‡	3800W	57	010617130	£895.00	£1074.00
IG8000 ◆	7500W	129	010617135	£1699.00	£2038.80

2 & 3 TONNE TROLLEY JACKS

JACKS ALSO IN STOCK UP TO 5 TONNE

FROM £49.98 exc.VAT
£59.98 inc.VAT

CTJ3000GB

CTJ2250LP

Model	Type	Tonne	Order Code	exc.VAT	inc.VAT
CTJ2250LP*	Low Profile	2.25	020113070	£49.98	£59.98
CTJ3000GB	Pro Garage	3	020113032	£109.98	£131.98
CTJ3000C	Pro Garage	3	020113037	£149.98	£179.98
CTJ2QLP ●	Low Quick Lift	2	020111820	£149.98	£179.98

● WAS £183.59 inc.VAT

*CTJ2250LP has a 2.25 tonne capacity, has a low entry of only 80mm and includes 2 sockets

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Model	Min/MaxAmps	Order Code	exc.VAT	inc.VAT
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IMIG100NG	40-100	010115610	£149.98	£179.98

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WAS £113.99 inc.VAT

B = Bench mounted F = Floor standing

Model	Motor (W) Speeds	Order Code	exc.VAT	WAS inc.VAT	inc.VAT
CDP5EB	350 / 5	060712030	£84.99	£113.99	£101.99
CDP5RB	350 / 5	060710035	£89.98	£113.99	£107.98
CDP102B	350 / 5	060715512	£109.98	-	£131.98
CDP152B	450 / 12	060715522	£179.00	-	£214.80
CDP452B	550 / 16	060715575	£289.00	£358.80	£346.80
CDP502F	1100 / 12	060715592	£675.00	£826.80	£810.00

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- Ammeter
- Multi-position charge regulator
- Overload protection on charging cycle

Model	Max Amps Charge/ Boost	Order Code	exc.VAT	inc.VAT
BC125	20/120	010310125	£89.98	£107.98
BC190	38/180	010310190	£104.99	£125.99
WBC180 ‡	35/180	010311500	£149.98	£179.98
WBC400 ◆	60/350	010311515	£199.98	£239.98
BC520P	50/510	010311082	£259.00	£310.80

‡ WAS £191.98 inc.VAT ◆ WAS £262.80 inc.VAT

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GWH7
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WIRE

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GAS

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REMOVE DAMP

IDH50L

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DH30L

‡ WAS £239.98 inc.VAT

Models	Extraction Rate	Order Code	exc.VAT	inc.VAT
DH10L	10L/day	010410687	£104.99	£125.99
DH20L	20L/day	010410683	£169.98	£203.98
DH30L‡	30L/day	010410685	£189.98	£227.98
IDH50L	50L/day	010410611	£469.00	£562.80

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Fully tested to proof load

CES680F

FROM £69.98 exc.VAT
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*Folds for storage

- Rotates through 360°

‡ WAS £125.99 inc.VAT

Model	Capacity	Order Code	exc.VAT	inc.VAT
CES340	340kg	020110124	£69.98	£83.98
CES450	450kg	020110121	£79.98	£95.98
CES560 ‡	560kg	020110123	£99.98	£119.98
CES680F*	680kg	020110122	£135.99	£163.19

ANGLE GRINDERS

‡ WAS £35.98 inc.VAT

PRICE CUT NOW FROM £28.99 exc.VAT
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Model	Motor	Order Code	exc. VAT	inc. VAT
CAG800B‡	800W	060512110	£28.99	£34.79
CON1150	1150W	060514015	£34.99	£41.99
CAG2350C	2350W	060512030	£64.99	£77.99

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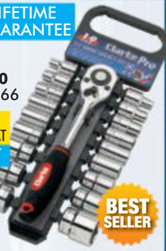

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040810766

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- Reversible ratchet
- Comfort grip handle

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HUGE RANGE OF RATCHETS, SPANNERS AND SOCKET SETS

Digital electronic torque wrench

- 1/2" drive size
- Chrome plated
- Soft grip handle

PRO237
040218237

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PLS265B

FROM £269.00 exc.VAT
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Honda & Diesel engine models in stock

Model	Pressure BAR/Psi	Motor HP	Order Code	exc.VAT	WAS inc.VAT	inc.VAT
Tiger1800B	110/1595	3	050412202	£269.00	-	£322.80
Tiger3000B	200/2900	6.5	050412212	£379.00	£478.80	£454.80
PLS195B	180/2640	5.5	050411362	£479.00	-	£574.80
PLS220	230/3335	9	050410347	£639.00	£802.80	£766.80
PLS265B	225/3263	13	050411367	£698.00	£898.80	£837.60
PLS360	248/3600	13	050410375	£979.00	£1197.60	£1174.80
DLS360	248/3600	9	050410376	£1199.00	-	£1438.80

HEAVY DUTY LONG REACH JACKS

PRICE CUT NOW FROM £264.99 exc.VAT
£317.99 inc.VAT
WAS £322.80 inc.VAT

CTJ2GLS

● WAS £322.80 inc.VAT

Model	Tonnes	Order Code	exc.VAT	inc.VAT
CTJ2GLS ●	2	020111026	£264.99	£317.99
CTJ3GLS	3	020113085	£349.00	£418.80
CTJ5GLS	5	020113090	£469.00	£562.80
CTJ10GLS	10	020113095	£649.00	£778.80

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FOR TOUGH DAILY USE

CSA10BB

* Available with/without 7 pce pin, bracket & pressing plate kit
# Economy model
‡ WAS £454.80 inc.VAT

Model	Order Code	exc.VAT	inc.VAT
CSA4B-4 tonne bench#	020413025	£169.98	£203.98
CSA10BB 10 tonne bench	020414020	£289.98	£347.98
CSA12F 12 tonne floor*#‡	020413020	£369.98	£443.98
CSA20FBT 20 tonne floor	020414058	£489.00	£586.80

INTELLIGENT BATTERY CHARGER/ MAINTAINERS

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IBC20

Model	Tank Volume	Flow Rate Req.	Order Code	exc.VAT	inc.VAT
IBC7	12/24V	7A	010317008	£39.98	£47.98
IBC15	12V	15A	010317010	£49.98	£59.98
IBC20	12/24V	20A	010317012	£62.99	£75.59
IBC25	12/24V	25A	010317013	£79.98	£95.98
IBC40	12/24V	40A	010317014	£99.98	£119.98

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Model	Tank Volume	Flow Rate Req.	Order Code	exc.VAT	inc.VAT
CPSB100B	32 litre	6-25 cfm	000510133	£169.00	£202.80
CPSB200B	63 litre	6-25 cfm	000510134	£209.00	£250.80

BOTTLE JACK

5 TONNES

- Tough cast iron base with screw in components
- High quality polished steel ram

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£29.99 inc.VAT

CBJ5B
020112012

CAR RAMPS

UK MADE

- Lift cars safely and quickly
- Tough angled steel construction

CR2

Model	Capacity	Order Code	exc.VAT	inc.VAT
CR2	2000kg	051710149	£39.98	£47.98
CRW25	2500kg	051710153	£47.99	£57.59

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PER PAIR

WORKSHOP AIR TOOLS

CAT131
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£65.99 inc.VAT
WAS £68.39 inc.VAT

BEST SELLER

PGF14
000510090

PRICE CUT £25.99 exc.VAT
£31.19 inc.VAT
WAS £32.39 inc.VAT

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300 HAND TOOLS INCLUDED

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CHT859
040210641

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Model	Pieces	Order Code	exc.VAT	inc.VAT
CHT641	199	040210641	£84.99	£101.99
PRO394	90	040218394	£109.98	£131.98
CHT862	235	040212862	£114.99	£137.99
CHT859	300	040213859	£197.00	£236.40
PRO396	222	040218396	£629.00	£754.80

1 TONNE STRUT SPRING COMPRESSOR

- Hydraulically powered, foot control operated device
- Adjustable spring retainers
- Springs up to 400mm diameter & 520mm in length
- Tough steel safety guard

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SSC1000G
020411030

BOLTLESS SHELVING/ BENCHES

- Simple fast assembly in minutes using only a hammer

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RED, BLUE, SILVER, GREY & GALVANISED STEEL

Model	Dims WxDxH(mm)	Order Code	exc.VAT	inc.VAT
150kg	800x300x1500	070710802	£39.98	£47.98
350kg	900x400x1800	070710808	£57.99	£69.59

LOW NOISE AIR COMPRESSORS

SHHH24/150
000112440

FROM £139.98 exc.VAT
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LOW NOISE LEVEL

Model	HP	CFM	Order Code	exc.VAT	inc.VAT
SHHH24/150	1.5	7	000112440	£139.98	£167.98
SHHH50/150	1.5	7	000112445	£179.98	£215.98
SHHH50/350	3.5	16.9	000112450	£269.00	£322.80

PARTS WASHERS

FROM £59.98 exc.VAT
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CAR BEST BUY

CW2D **CW1D**

‡ WAS £173.99 inc.VAT

Model	Tank Cap.	Type	Order Code	exc.VAT	inc.VAT
CW2D	10Ltrs	Bench	050810031	£59.98	£71.98
CW1D ‡	45Ltrs	Floor	050810030	£144.99	£167.98
CWM20	22.5Ltrs	Floor	050810020	£169.00	£209.99
CW40	75Ltrs	Floor	050810920	£219.00	£262.80

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BEST SELLER

CP185
060310185

180mm PAD DIA.

- 6 stage variable speed control

WHEEL DOLLY (PAIR)

- 603x370x150mm

AWD1
051310205

LOAD RATING: 500KG PER DOLLY

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SWIVEL, NON MARKING CASTORS

WARRIOR WINCH

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20SPS12

Model	Capacity	Order Code	exc.VAT	inc.VAT
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UP TO 7938KG CAPACITY IN STOCK

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- Compact enough to fit in a vehicle glove box

JSM1000

‡ WHAT CAR BEST JUMP STARTER 2024

* AUTO EXPRESS CHOICE JUMP STARTER 2024

Model	Start Boost	Peak Boost	Order Code	exc.VAT	inc.VAT
JSM600	300A	600A	010319020	£49.98	£59.98
JSM1000*	500A	1000A	010319025	£59.98	£71.98
JSM1200‡	600A	1200A	010319030	£69.98	£83.98

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BRISTOL, BS5 9JJ	0117 935 1060
BURTON, DE14 3QZ	01283 564708
CAMBRIDGE, CB4 3HL	01223 322675
CARDIFF, CF24 3DN	02920 465424
CARLISLE, CA1 2LG	01228 591666
CHELTENHAM, GL52 2EH	01242 514402
CHESTER, CH1 3EY	01244 311258
COLCHESTER, CO1 1RE	01206 762831
COVENTRY, CV1 1HT	02476 224227
CROYDON, CR2 6EU	0208 763 0640
DARLINGTON, DL1 1RB	01325 380841
DEAL KENT, CT14 6BQ	01304 373434
DERBY, DE1 2ED	01332 290931
DONCASTER, DN2 4NY	01302 245999
DUNDEE, DD1 3ET	01382 225140
EDINBURGH, EH8 7BR	0131 659 5919
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GATESHEAD, NE8 4XA	0191 493 2520
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LEICESTER, LE4 6PN	0116 261 0688
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LONDON CATFORD, SE6 3ND	0208 695 5684
LONDON EDM'TON, N18 020	0208 803 0861
LONDON LEYTON, E10 7EB	0208 558 8284
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MAIDSTONE, ME15 6HE	01622 769572
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MC OPENSHAW, M11 1AA	0161 223 8376
MANSFIELD, NG19 7AR	01623 622160
MIDDLESBROUGH, TS17 6BZ	01642 677881
NORWICH, NR2 4LZ	01603 766402
NORTHAMPTON, NN5 5JW	01604 267840
NOTTINGHAM, NG1 1GN	0115 956 1811
PETERBOROUGH, PE1 2PE	01733 311770
PLYMOUTH, PL4 9HY	01752 254050
POOLE, BH14 9HT	01202 717913
PORTSMOUTH, P03 5EF	02392 654777
PRESTON, PR2 6BU	01772 703263
SHEFFIELD, S2 4HJ	0114 258 0831
SIDCUP, DA15 9LU	0208 3042069
SOUTHAMPTON, SO17 3SP	02380 557788
SOUTHEND, SS9 3JJ	01702 483742
STOKE-ON-TRENT, ST1 5EH	01782 287321
SUNDERLAND, SR2 9QF	0191 510 8773
SWANSEA, SA7 9AG	01792 792969
SWINDON, SN1 3AW	01793 491717
TWICKENHAM, TW1 4AW	0208 892 9117
WARRINGTON, WA2 8JP	01925 630937
WIGAN, WN5 9AU	01942 323785
WOLVERHAMPTON, WV4 6EL	01902 494186
WORCESTER, WR1 1JZ	01905 723451

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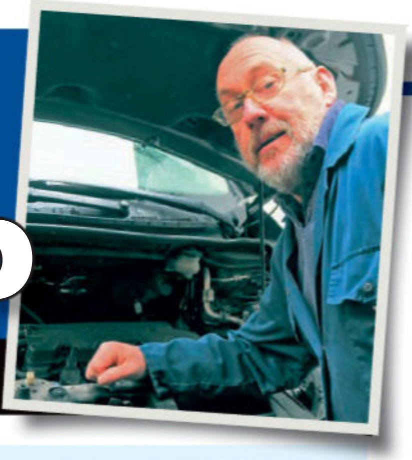
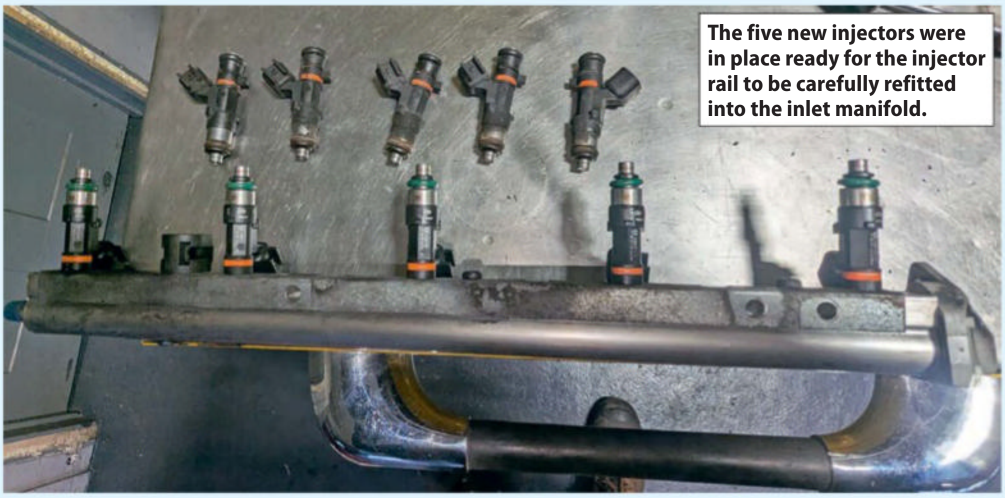
Tales from the workshop

Fixing advice from our garage proprietor **Steve Rothwell**



FORD FOCUS ST

Injector upgrade



The five new injectors were in place ready for the injector rail to be carefully refitted into the inlet manifold.

I am of the age when I remember that improving the performance of your motor could be done by fitting a different carburettor setup. With the introduction of fuel injection and the efficiency and precision that brings, most engines will reach their potential with little alteration.

There are still those enthusiasts who are not happy with the designed potential and want that little but more power. The owner of this 2007 Ford Focus 2.5 ST was one of those owners and had the ECU remapped to allow the engine to perform at its upper level, but to reach that level the injectors also needed to be upgraded, and so with the performance injectors ready to go in, I was asked to fit these.

The job time on this is 1.6 hours, but it is a job that should not be rushed. If one of the injector seals catches when fitting the rail back in place, this will allow petrol to leak out uncontrollably, and air to leak in – and the rail will then need to be removed again to fit a new seal. This one went smoothly – and hopefully the owner will now be happy with the performance.

JEEP WRANGLER

EVAP issues

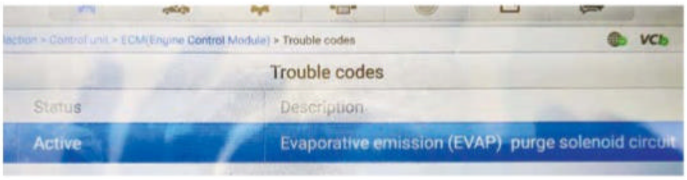
The view from the vehicle owner's perspective is often that once the magic box of tricks is plugged in (OBD scanner), the reason for the problem will be known – and then it is just a case of replacing the part as advised by the fault code displayed.

Occasionally this is the true scenario, but often this is not the case and a much deeper investigation into the problem needs to be undertaken to resolve the issues.

This 1997 Jeep Wrangler 4.0 was one of the first in the range to be fitted with the modern on-board diagnostic plug and this allowed me to plug the diagnostic scanner on to determine why the engine management light was showing.

The code P0443 was showing. This code indicates a problem in the circuit to the evaporative emission (EVAP) canister purge valve. This problem could have been several things including a poor connection, a failed solenoid or a fault in the wiring between the EVAP valve and the ECU.

In this case the problem was as simple as a poorly-fitting plug, and after a quick clean with an electrical cleaning spray, the plug was refitted and the code cleared. A nice easy one!



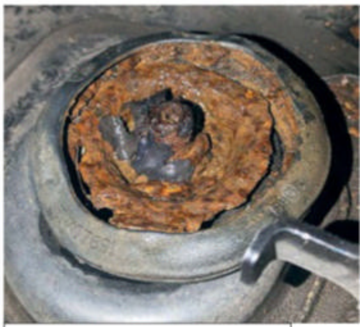
lection > Control unit > ECM(Engine Control Module) > Trouble codes

Trouble codes

Status	Description
Active	Evaporative emission (EVAP) purge solenoid circuit

FORD KA

Rusty strut top



The top nut on the strut was not going to be easy to remove – years of corrosion had eaten into the nut and the top washer.

What should have been a straightforward stut replacement to this 2010 Ford Ka took a little longer than expected. The problem causing the extra work and the obstacle to the job going smoothly was a severely corroded top strut mount nut. This is quite common across a range of motors and the Ford Ka is often a culprit of this corrosion.

I have got into the habit whenever a motor comes in for a service for any work that requires the bonnet to be opened to have a quick glance at the condition of the strut top nut. Any that look less than shiny get a little squirt of oil because one day that nut may need to be removed and if lubricated in plenty of time that job will go easier.

This little Ka was not a regular of mine though and the top strut mount nut was rusty along with the top mount plate that it was supposed to be securing. After this slight set back, the nut and the strut were removed, and the strut/nut and top mount were then renewed. Once all fitted, a light smear of grease was put over the thread so that if this Ka survived long enough to require the strut replacing a few years down the line, the next time the job would go more smoothly.

VOLVO 760

Seat belt swap

The seat belt catch and the seat belt operation on this 1990 Volvo 760 2.8 petrol had been a little sticky for a while now. Sometimes the belt would not pull out smoothly and at other times the catch would take a couple of attempts to click into place.

The owner understood the belt needed to be operating correctly for the upcoming MOT but was also well aware that the belt was there for safety and so needed to be working correctly despite the impending MOT.

The seat section of the seat belt catch is not easily accessed and requires the complete seat to be removed in order to access the fitting and the connected cable. The large leather seats in this Volvo are quite a lump to remove, but all the fixings did come undone a lot easier than I had expected.

The safety of the vehicle occupants is of course paramount and so the owner was not to staggered by the cost of the replacement. They were especially pleased that I had vacuumed the carpets while the seat was out, returning the Volvo a little cleaner than it had been presented.

The seat needed to be removed to access the fittings for the seat belt and replace the seat stalk.

BMW 5-SERIES

Sudden roar

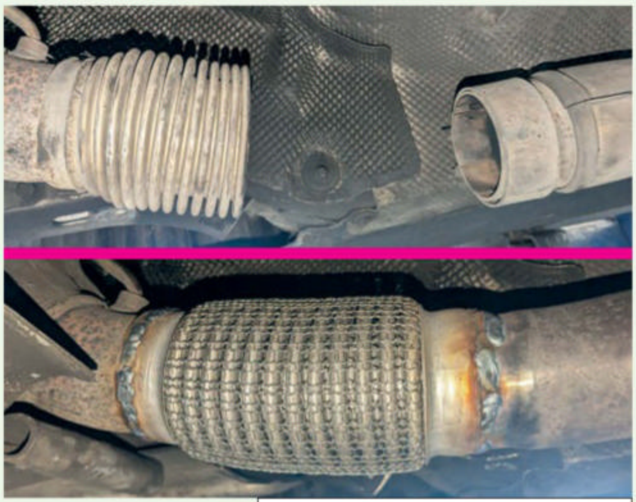
The gentle purr of this 2004 BMW 530d was starting to be interrupted by a louder exhaust blow from under the vehicle. The owner was thinking that this problem could wait until the MOT which was due in around six weeks' time.

The slight blow however developed suddenly into a loud and uninterrupted blast of noise that pretty much confirmed to the owner that none of the escaping exhaust gasses were being directed through the exhaust silencer system.

A quick look revealed that the flexi section of the pipe which was part of the cars oxidation catalytic converter and diesel particulate filter had failed completely and dropped apart.

This is now quite a common scenario and so the availability of a short repair section, eliminating the need to fit a new DPF unit makes the repair an easier option.

There are a few options available, and there are versions of the repair pipe that will clamp into position for those that do not have welding facilities. I decided that the short weldable section was the best option in this case, and so the part was ordered up and fitted.


The short flexi piece of exhaust is part of the DPF but a repair section can be fitted in place saving the expense of the complete DPF/catalyst assembly.

Follow Steve on X: www.twitter.com/cmtips

SUBARU IMPREZA

Leaky diff

Oil escaping from any area is normally an unwanted find. This 2003 Subaru Impreza 2.0 was in for a routine service and the owner was unaware of any problems. With the motor up on the ramp a quick inspection underneath revealed an oily film around the offside rear driveshaft joint on the rear axle. The problem I suspect had not been there long but the oil level in the diff had dropped and so this was something that needed addressing sooner rather than later.

Phoning the customer, they agreed that the seal should be changed now and added that this is really the idea of having a regular service to find any problems before they develop.

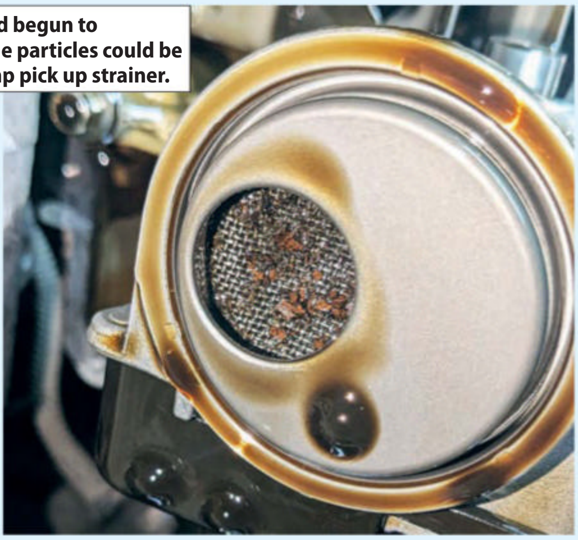
You can't really argue with that logic and so with the seal ordered up, the job of replacing the leaking seal was undertaken.

The first check was to ensure that the driveshaft joint was in good condition and that the diff bearing had no play – if either of these factors had been present, then further work would have been needed. With the bearings feeling good and the surface of the driveshaft joint smooth, the new seal was fitted in place and the diff refilled with oil.

With the old leaky seal removed and the area cleaned up it was just a matter of carefully fitting the new seal and reassembling.

FORD FIESTA

Timing belt due

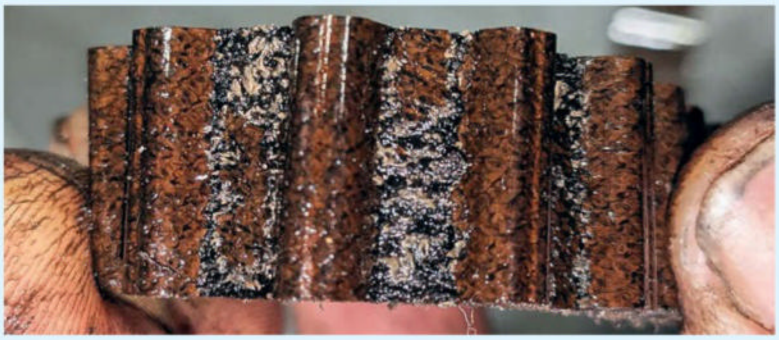


The timing belt had begun to deteriorate, and the particles could be seen in the oil pump pick up strainer.

▶ The owner of this 2013 Ford Fiesta 1.0 EcoBoost covered around 15,000 miles a year, which is above the average. They had only owned the motor for just over a year and were totally unaware of the possible need for a timing belt replacement. It was only after a friend had asked if the Fiesta had one of those "EcoBoom" engines that some concern over the possibly problems was realised.

With the Fiesta over the ten-year mark, I did suggest to the owner that a new timing belt would be a good option, and then had to gently alert them of the cost of the over seven hour job, and the checks that should be made during the work.

The owner agreed that the job should be carried out and so the Fiesta was brought into the workshop and the work carried out. This did prove to be a timely investment, and particles of belt could be seen on the oil pick up strainer, indicating that the fabric of the belt had begun to deteriorate.



The water pump was also showing signs of coolant escaping past the seal, and so a new water pump was fitted along with the new timing belt and oil and filter change.

Returning the Fiesta back to the owner, I was confident that without the work having been carried out, the lifespan of the engine would have been vastly reduced.

CITROËN C3

Broken road spring

▶ Looking particularly limp on one side, the owner of this 2012 Citroën C3 1.6 HDi was in no doubt that something had gone wrong with the suspension overnight. At first glance they thought it may be a flat tyre, but this was not the case, and the wheel and tyre looked to be in good condition.

Deciding that driving the motor in this condition would not be a great idea, they called out their recovery service to get the C3 along to the workshop.

By the time the Citroën arrived at my door, the problem had been confirmed as a failed coil spring. The owner had already had a discussion with the recovery driver that replacing both front springs would be a prudent move. All that was left for me to do was to order up two new road springs, and then fit them.

The book time for removing the strut and replacing the spring is 1.9 hours for one side or 3.3 hours for both, so although the initial outlay is more, the saving on labour time, and possible downtime is worth the outlay.

With a couple of new springs fitted, the C3 was sitting level and ready to go.

The small coil on the spring had broken away allowing the car to drop dramatically, but thankfully no other damage had been done.

AUDI A3

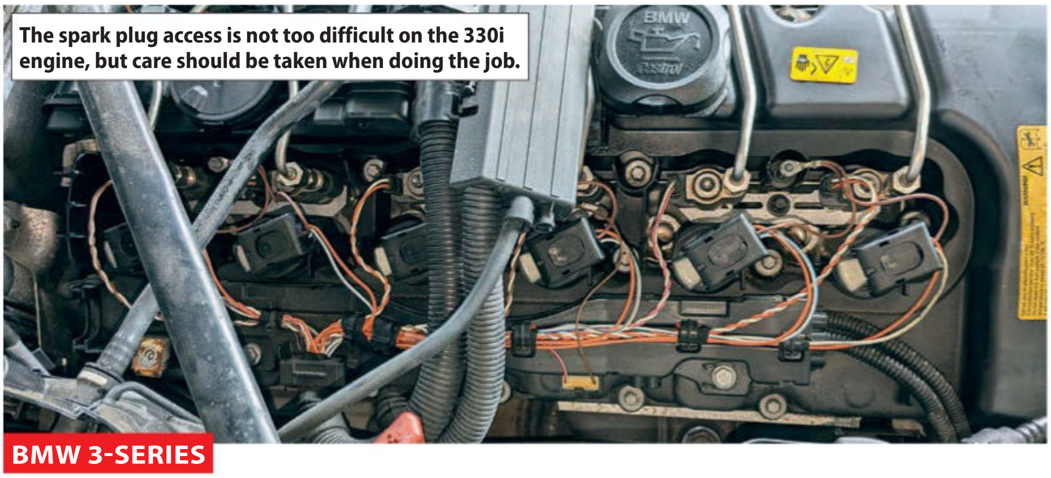
Cooling system rescue

▶ A few years ago, someone at VAG had the idea that putting a small bag of silica gel into the header tank on a range of the VAG vehicles was a good idea. The process behind the decision is that the bag of silica gel would extend the working life of the coolant. As I am not a bio chemist, I have no idea how this would work, or the extent to which the coolant life would be enhanced by this addition. But as a mechanic I do know that when these little bags burst allowing the silica gel to be transported around the cooling system – it blocks heaters and other water channels as a result.

The owner of this 2014 Audi A3 2.0 TDI, upon discovering that the A3 did have this little bag in the header tank, asked if it could be removed to save the worry that it may split.

This is something that can be done quite easily but does need to be carried out carefully to ensure that the bag is not torn, releasing the silica gel in the process. This little bag was manoeuvred out without damage, but it was discovered once the bag was removed that it had started to split and so this was a just in time job.

Removing the bag of silica gel, it was discovered that a small split in the bag has started to appear and if left any longer this may have been a bigger job.



The spark plug access is not too difficult on the 330i engine, but care should be taken when doing the job.

BMW 3-SERIES

Be careful when fitting new spark plugs

▶ I was recently reminded that sometimes even the straightforward jobs, can take nasty turn and so care is always needed when any work is carried out.

The plugs on this 2012 BMW 330i are quite accessible, once the clutter is moved away from the top of the engine. The next step is to lift each coil pack connector to release the wiring loom from each coil pack, the individual coil packs can then be removed to expose the spark plugs.

Removing these should then be a simple step, but I was reminded by a customer recently of a simple plug change that went wrong. This was also on a BMW 330i, and the owner had used a poorly fitting spark plug socket, and an extension that was too long. The combination of these two points had allowed the socket to slip as the spark plug was loosened, and this had cracked the porcelain insulator on the old spark plug.

This did not concern the owner as he was fitting new spark plugs anyway so why worry about the old ones? The reason he soon found out was that a small segment of porcelain had dropped down the open spark plug hole and was now sitting on top of the piston.

There it stayed unnoticed until the job was finished, and the engine started up. At this point the reality struck home, and the owner suddenly realised why he should have considered the old broken spark plug!

LAND ROVER FREELANDER

Lost wheel nut key

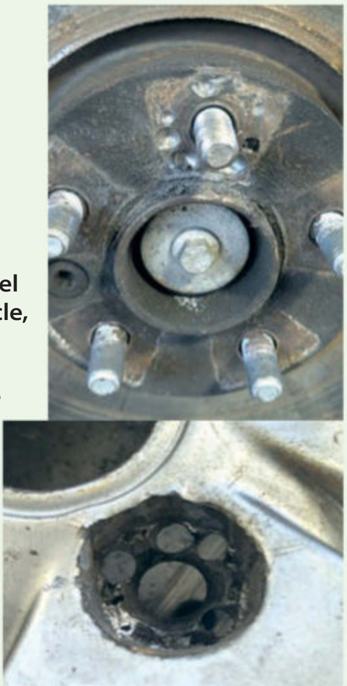
▶ Locking wheel nuts are a common fitment across a wide range of vehicles and were originally used to prevent the theft of expensive alloy wheel, but in this modern age, even standard wheels with new tyres can be an attractive temptation to the types that have no scruples.

The problem for the owner occurs when the locking wheel nut key is either not passed along with the sale of the vehicle, or at some point becomes lost.

The owner of this 2014 Land Rover Freelander TD4 had owned the motor for several years and knew exactly where the locking wheel nut key was at the last service, but now with a puncture and the need to use the key, it was nowhere to be found.

At this stage he should have come straight along to see me, but he decided that it would not be too difficult to drill the nut off. Nearly six hours later he decided that perhaps the job was best left to the garage. Unfortunately by this time quite a bit of damage had been done. The drill had gone through not only the nut, but the wheel rendering it unusable. What remained in place took less than a minute to remove to allow the wheel to come off and the damage exposed.

There are several ways that locking wheel nuts can be removed, and this event would have been a lot less expensive for the customer if he had of just let me attend to the problem.



The owners attempt to drill off the locking nut had resulted in the drill going through the wheel and reaching the brake disc. The brake disc would be OK, but the wheel needed replacing.

HONDA CIVIC

Shocking steering

▶ I always enjoy having an old Honda in the workshop, owing a Honda myself I am happy to see that I have a chance of keeping my CR-V on the road for a few years to come.

This particular Honda was a 1996 Honda Civic and other than the shaky steering that the Civic was in for, the 1.5 petrol engine was running well. The steering did, though, feel quite bad and was described by the owner as in a shocking state. The problem was a badly worn steering rack which needed to be replaced.

The steering rack replacement on this little Honda has a book time of 1.6 hours and requires the exhaust dropping down at the manifold to give the needed room for removal.

Once the replacement rack was fitted in place and the exhaust back in position, the engine was started to ensure that there were no leaks before then checking and adjusting the tracking.

When all back together and the steering geometry set, I gave the Civic a quick drive around the local roads to confirm that the motor was driving well and good to go back to the owner.

Once the exhaust downpipe was removed, there was sufficient access to take off the steering rack and fit the replacement unit.

ADVERTORIAL

ACTRONICS

REMANUFACTURED TO LAST

The experts in remanufacturing car electronics

From ABS and ECU testing to instrument cluster repair, our team are experts in remanufacturing electronic car parts, ensuring they will perform as new. With 20 years of experience under our belts, we're proud to be one of Europe's market leaders in automotive remanufacturing, providing a quick, effective, and affordable remanufacturing solution.

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Whilst repairing a malfunctioning car part can provide a quick fix, there is a better, longer-lasting alternative that will ensure your electronic unit performs to the highest standard. A repair will only fix the defective parts, but a remanufacture identifies and addresses all these malfunctions as well as the weak points commonly found in that unit.

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STOP
SERVICE
INSTANTANEOUS INFORMATION

ADVERTORIAL

Adblue use

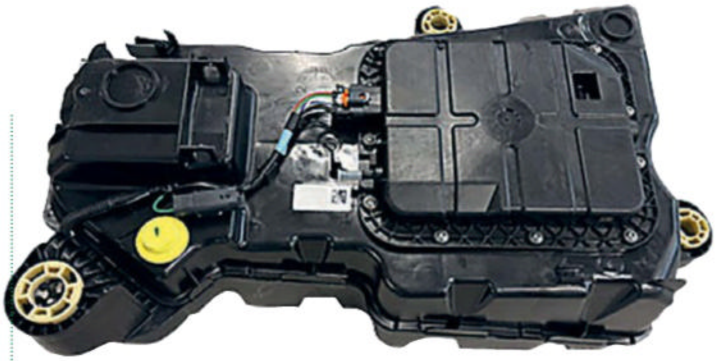
AdBlue Tank Assembly Repair –
Peugeot Partner/Citroën Berlingo (2008-2018)

AdBlue was introduced along with Euro 6 emission standards as an aid for reducing the harmful nitrogen oxide (NOx) emissions that diesel engine vehicles produce. A common symptom of failure is an "Emission Control Fault" message appearing on the dashboard, often accompanied by the engine warning light. If not addressed in time, the vehicle may even enter limp-mode or display a countdown indicating that it will not restart after a certain number of miles.

Common Faults

One of the most common issues involves defects in the integrated AdBlue control unit (mounted within the tank). These may include: Internal corrosion or water ingress; short circuits or internal electrical faults; crystallisation of AdBlue fluid around the injector or level sensors; faulty temperature, level, or quality sensors within the tank.

These faults may also cause communication issues with the engine ECU or other systems within the vehicle. Often, the complete AdBlue tank assembly must be replaced; however, a remanufacture is often a far more cost-effective and sustainable solution.



Observing and Diagnosing Faults

Technicians may notice during diagnosis that the system is no longer heating the AdBlue fluid, even when required (e.g. in colder temperatures). A short circuit in the control unit may also prevent diagnostics communication, or a fault may be stored with a permanent status that cannot be cleared.

In some cases, crystallisation caused by AdBlue residue may block the injector or damage internal wiring and sensors, contributing to system errors and inaccurate readings.

Fiat group: Blue & Me Repair – Body Control Units

ACTRONICS offers a high-quality remanufacturing solution for the common problems with the Blue&Me Module, an infotainment system used in various Fiat Chrysler Automobiles (FCA) vehicles between 2006 and 2017. This module is known for enabling hands-free calling, music control, and voice control functions, but can develop malfunctions over time that affect the use of the car.

Known problems with the Blue&Me Module

Flashing odometer reading; no communication; no Bluetooth connection; an unstable Bluetooth connection; USB port not working; steering wheel controls not working; battery draining; media player not working; error codes 'Blue and Me'.

U1733 and P0022 error codes are common with the FCA Blue & Me Module. If one of these error codes occurs during vehicle diagnosis, an overhaul of the Blue&Me control unit is necessary.

The Blue&Me Module is usually located under the passenger seat. By sliding the seat forward and removing a black cover, the module becomes visible. In some models, such as the Fiat 500, the Module is located at the rear of the vehicle, near the speaker on the passenger side. In the Fiat Punto, the module is located in the glove compartment. This can therefore vary per model, so consult the manual of the specific vehicle for the exact installation location.

Models in which the Blue&Me Module is used: **Abarth 500/595/695** (from 2008), **Abarth Grande Punto** (2008-2014), **Alfa Romeo Giulietta** (2010-2020), **Alfa Romeo Mito** (2008-2018), **Fiat 500** (from 2007), **Fiat Bravo** (2006-2014), **Fiat Doblo** (2009-2022), **Fiat Fiorino** (from 2007), **Fiat Grande Punto** (2005-2011), **Fiat Panda** (from 2012), **Fiat Punto** (1999-2012), **Fiat Punto** (2012-2018), **Fiat Punto Evo** (2009-2012), **Ford Ka** (2008-2016), **Lancia Delta** (2008-2014), **Opel Combo D** (2012-2018)

Successful overhaul by ACTRONICS

ACTRONICS repairs, overhauls and restores the Blue&Me Module and many other electronic car components. A good diagnosis of the defect is essential for a successful overhaul. **ACTRONICS** has a specific test setup for each BCM, so that we can make the correct diagnosis, check all functions and perform a final test. In this way, the success rate at **ACTRONICS** is extremely high.

Revision is cost-saving

You get the Plug & Play part back. We revise the original part, so that it is immediately ready for use to be reinstalled. No reprogramming is required. We always offer a 2-year warranty on the revision of your Blue&Me Module, so that you are assured of a sustainable and high-quality solution.

Your Blue&Me Module repaired by ACTRONICS

If you have a defective Blue&Me Module, simply look at our website (**www.actronics.co.uk**), under Body Control Units you will find links to various BCMs including the Blue&Me.

ACTRONICS offers specialised repair services for Blue&Me BCMs that restore the original functionality of the system while saving up to 80% of the costs compared to a new part.

The experts in remanufacturing car electronics

Our range is continually expanding – in 2024, we remanufactured more than 15,000 parts. If you have an electronic control unit, we can help! Our range covers over 1200 different components from over 60 brands.

Over the past decade, the number of **Battery Electric Vehicles** on UK roads has increased tenfold. At **ACTRONICS**, we have followed this trend closely to ensure we can support these developing vehicles. We're continually working to expand our range of onboard chargers, and are now able to offer remanufacturing solutions for chargers from 15 different OEMs.

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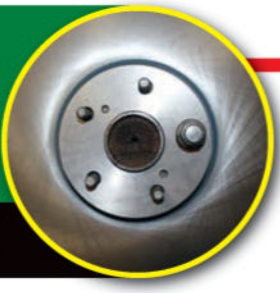
HIT the BRAKES



How to service your vehicle's braking system

PEUGEOT 2008

PART 1: Rob Hawkins replaces the front discs and pads on a 2016 Peugeot 2008 1.2.

Looking through the spokes of the road wheels, editor Martyn's auction-purchased Peugeot 2008 clearly needed a new set of brake discs and pads. The discs were so worn, it was difficult to wrap a digital Vernier around them to measure their thickness.

With single-piston calipers at the front and ventilated brake discs, the work involved in removing the brake pads of the 2008 isn't particularly challenging although, as we discovered, it's wise to expect the unexpected. In our case, we found the slider bolts that secure the brake caliper had a mixture of 12mm and 13mm heads, so someone had replaced at least a couple of them. Mark Shipman at AES (where we completed the work shown) wasn't at all surprised.

THANKS TO

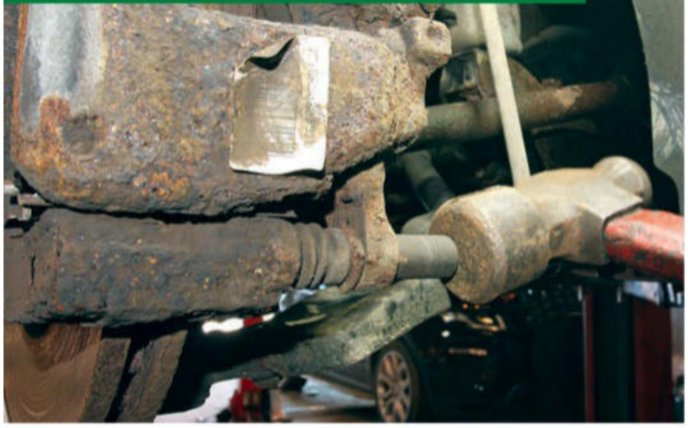
AES York Limited
01904 780149
autoelectricsyork.co.uk

febi bilstein
www.febi.com/en
01246 479080

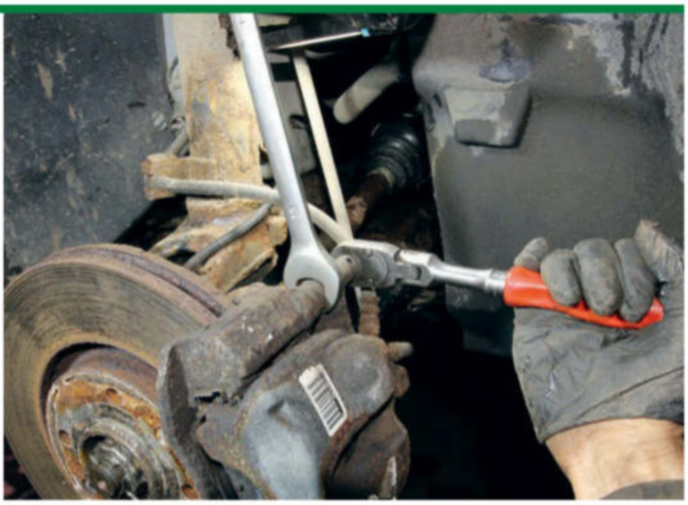
One of the most potentially problematic issues with the Peugeot 2008's front brakes concerns the Torx T55 bolts that secure the caliper carrier to the hub. Each carrier needs to be removed to be able to in turn remove the brake disc, and those T55 bolts should have been tightened to 105Nm, so add several years of corrosion into the mix and you could be asking for trouble. A breaker bar should help to undo the bolts, but the biggest potential issue is if the T55 bit slips and rounds off the inside of the head. Consequently, we took our time cleaning inside the head with a wire brush and a pick before fitting the T55 bit and tapping it fully into position (this also helps to shock and release each bolt).

A similar but less stressful problem can arise with the small Torx T30 screws that secure each brake disc to the hub. These should be tightened to a mere

FRONT DISCS & PADS



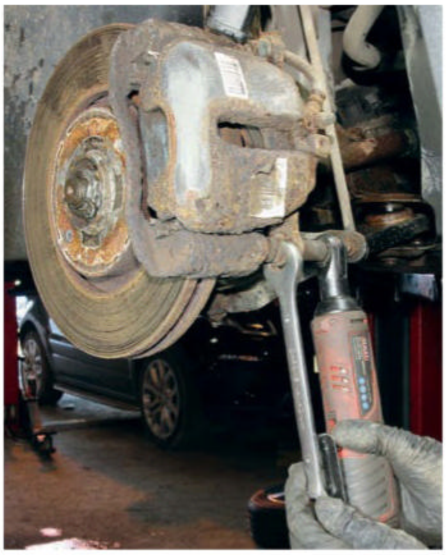
1 With the Peugeot 2008 raised on a two-post lift at AES, the road wheels were removed, and we made a start on replacing the front discs and pads. The two slider bolts for each caliper were removed, tapping a 12mm socket into position to shock the bolt and ensure a good fit.



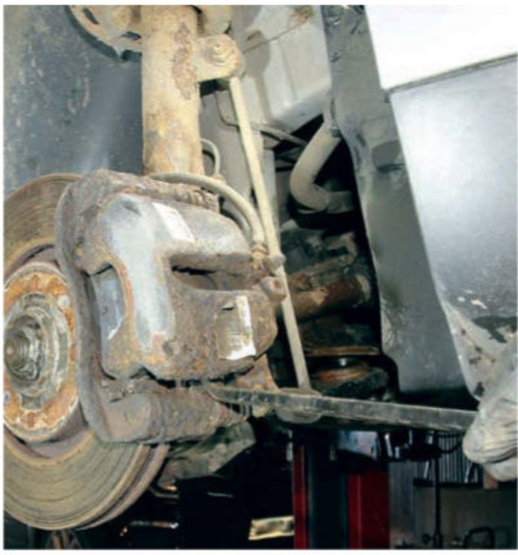
2 Mark Shipman at AES said that the two bolts are usually either 12mm or 13mm, and he was correct. The nearside bolts were 13mm, whereas the offside were 12mm. We used a 19mm open-ended spanner to grip part of the slider because it rotated when undoing the respective bolt.

10Nm but always feel like the last person who fitted them had been swinging on a scaffold pole. Cleaning each head and shock tactics (tap the bit into position) should help to avoid a rounding off. We discovered one of the screws had been replaced with a Phillips (crosshead) type, which wasn't a bad idea, although it had been chewed a little, so we were bracing ourselves for having to drill the head off. We had a lucky escape.

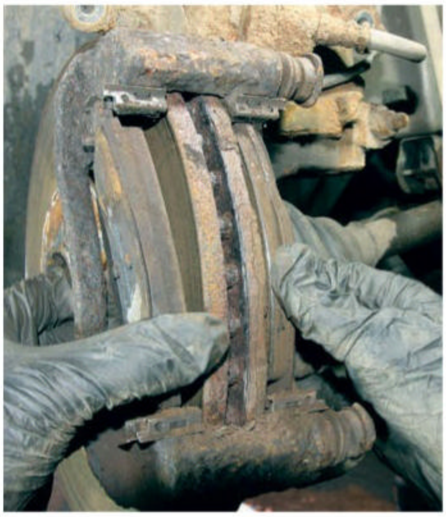
We've decided to split this particular *Hit the Brakes* feature into two parts, covering the rear discs, pads, calipers and flexi-hoses in the next issue of *CM*. Whilst the front discs and pads look relatively straightforward, replacing the aforementioned parts on the rear isn't quite so plain sailing, so it warrants a feature on its own. Find out next month as to why it took us seven hours to complete the rear, whereas the front discs and pads can be completed in less than a couple of hours.



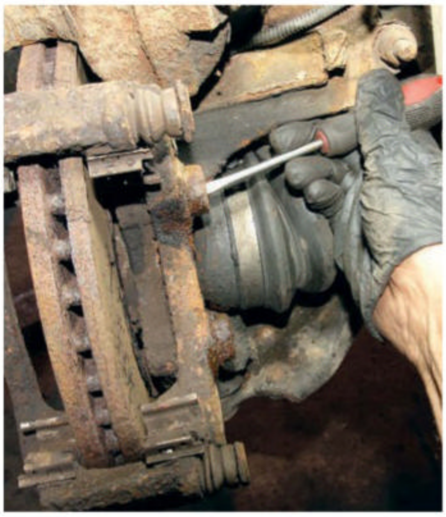
3 **And for speed, we used a 12V battery-powered 3/8in ratchet drive to undo the slider bolts (once they had been slackened). We tested this one from Sealey in the November 2019 issue of *CM* and it's still working after nearly six years.**



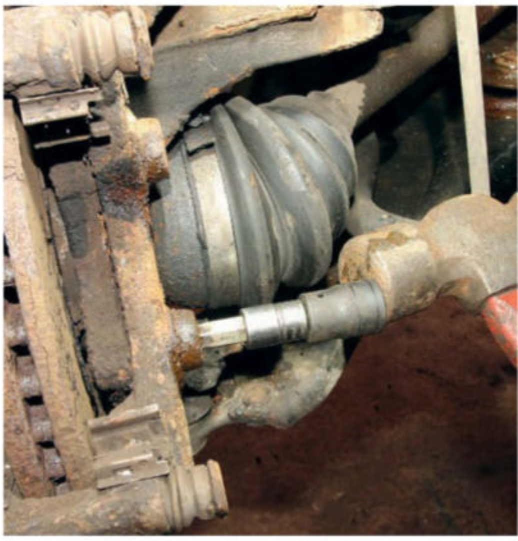
4 **Once the slider bolts had been removed, a pry bar was needed to lever the caliper off, wiggling and manoeuvring it along the top and bottom edges until it was released. We also tried to lever against the piston to retract it a little.**



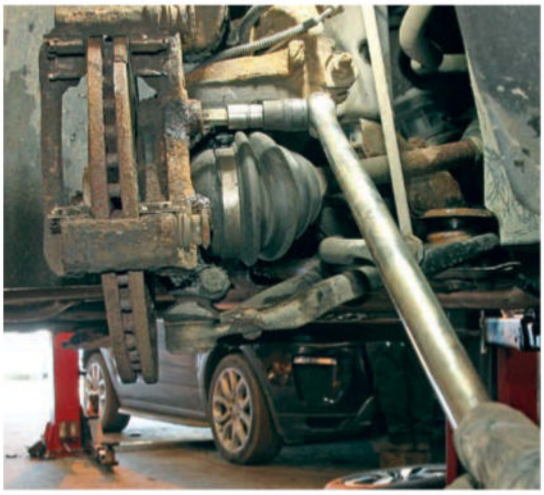
5 **With the caliper removed and suspended, the brake pads remained in the carrier, sitting on stainless steel shims. Earlier in the day, we'd worked on another Peugeot 2008 and had to lever off the remains of the pads. These weren't too bad and easy to remove by hand.**



6 **The next job was to remove the caliper carrier – it obstructs removal of the disc. Two Torx T55 bolts secure the carrier to the hub. First, we poked a small screwdriver inside the head of each one to remove any dirt and sprayed penetrating fluid around the head.**



7 **A Torx T55 bit was tapped into position using a hammer. This not only helps to ensure a tight fit, but also shocks the bolt, disturbing any corrosion. We wondered whether there was dirt still inside the head, so repeated Step 6.**

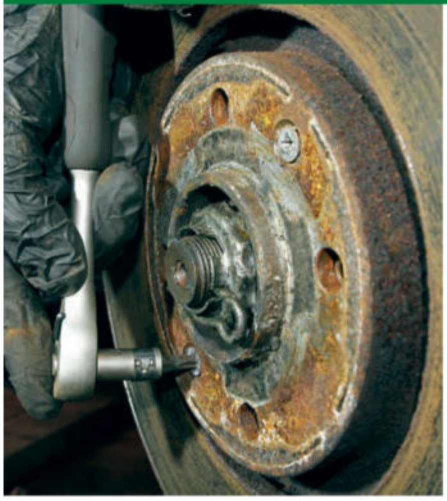


8 **◀ Mark warned that it's essential to avoid rounding off the head of the caliper carrier mounting bolts and that they are often quite tight (they should have been tightened to 105Nm). On this occasion, we had a lucky escape with all of them on the front.**

9 **▶ With the caliper carrier bolts removed, the carrier simply fell off. It was at this point that Rob realised he hadn't undone the two disc retaining screws and would have benefitted from jamming a screwdriver into the edge of the disc and wedging it against the caliper carrier.**

⇨

FRONT DISCS & PADS CONTINUED

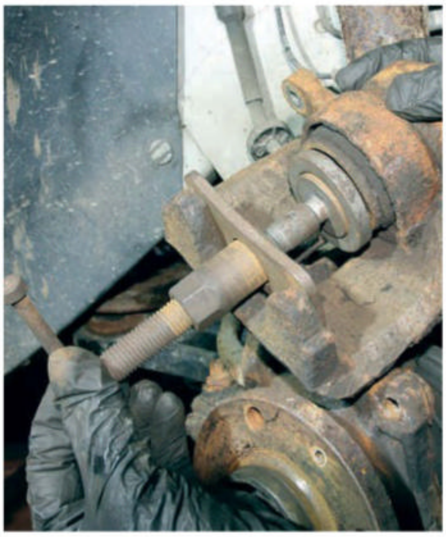


10 Two Torx T30 screws secure each front brake disc to the hub. One of them on the offside front had been replaced with a crosshead (Phillips) screw. Whilst these should only be tightened to 10Nm, if any are seized, the head can easily round off.

11 A couple of gentle taps around the back of the brake disc soon released it from the hub. Had we needed to be more aggressive, then it's worthwhile wearing ear plugs and safety goggles.

12 The condition of the mating surface on the hub (where the brake disc sits) wasn't too bad, with a light dusting of dirt and surface corrosion that was straightforward to clean off with a wire brush.

13 The inside of the caliper was also scrubbed with a wire brush, spraying brake cleaner over the metal surface (not the rubber dust cover) to help loosen any dirt. Years of brake dust and dirt had built up inside here.



14 With new, thicker brake pads to fit, the caliper's piston needed to be retracted to make room. We tried using a pair of water pump pliers, and whilst this was successful, it was easier to use a specific windback tool.

Drive
PROFESSIONAL
BRAKE CL

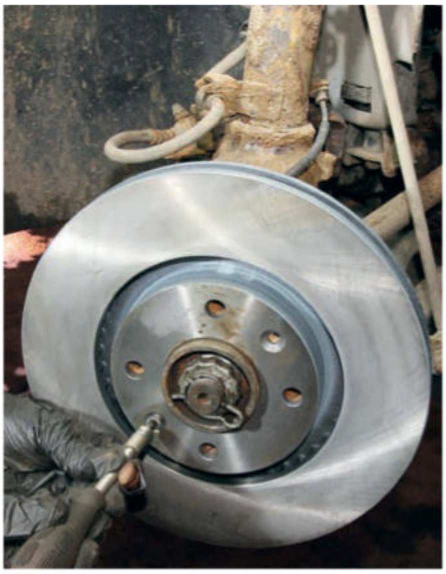
15 The caliper carrier needed a thorough clean. Supported in a vice, the old shims were removed to be able to clean underneath them – dirt and corrosion can build up under the shims and push them out, making it difficult to fit the brake pads.

16 ◀ Spraying brake cleaner over the caliper carrier helped to loosen the dirt, but it's not particularly good for the rubber boots around the slider pins (these were free-moving, so we decided not to extract and clean them).

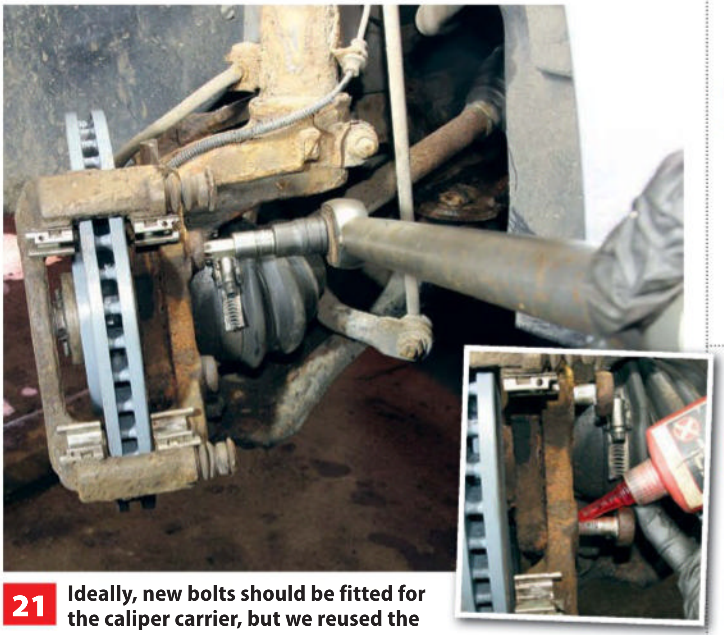
17 ▶ A wire brush was initially used to clean the caliper carrier, then a flat file helped clean the surfaces where the shims sit. They need to sit flat inside the caliper carrier, so this type of file helps to clean the respective surfaces.

18 We didn't have new shims, so refitted the old ones and cleaned any surface dirt from them with a wire brush and brake cleaner. They were soon looking shiny and as good as new again.

19 Comparing old and new brake discs ensured we had the right ones because there are two sizes (266mm and 283mm diameter). The new ones from febi were coated in a light anti-corrosion oil, so we sprayed over them with brake cleaner to remove this.



20 Each new febi disc was positioned on to the hub (the discs are not sided), then the two retaining screws (see Step 10) were refitted and tightened to 10Nm. There are six holes to line up between the disc and hub.



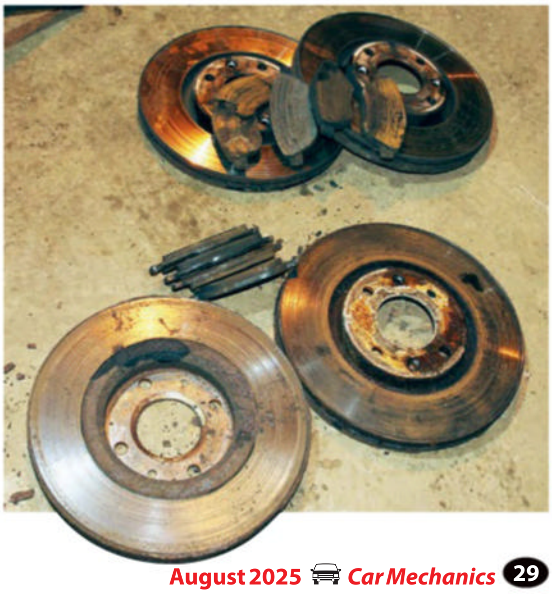
21 Ideally, new bolts should be fitted for the caliper carrier, but we reused the old ones, applying some thread lock to help reduce the risk of them loosening. And we also tightened them to the recommended 105Nm.

22 ▶ Next, Mark recommended applying a smear of brake paste to the top and bottom edges of the new brake pads and the backs (where contact is made with the piston of the caliper or the caliper itself).

23 ▶ With the new brake pads sitting inside the carrier, the caliper was refitted, followed by the slider bolts with a dot of thread lock, tightening them to the recommended 30Nm for the front brakes.

24 ◀ We were planning to tackle the rear brakes on another day, so pumped the brake pedal to ensure we had braking pressure, then checked the fluid level in the reservoir. It was over-full, so some fluid was extracted with a suitable syringe.

25 ▶ Looking at the old front discs and pads, the brake pads weren't too bad, but the discs had clearly worn. At the top of our photo, we've included the discs and pads from another 2008 we'd worked on, which were in an even worse condition.



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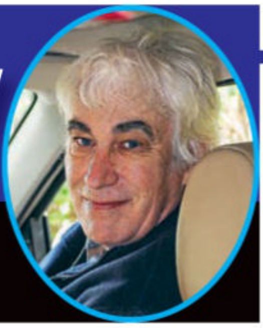
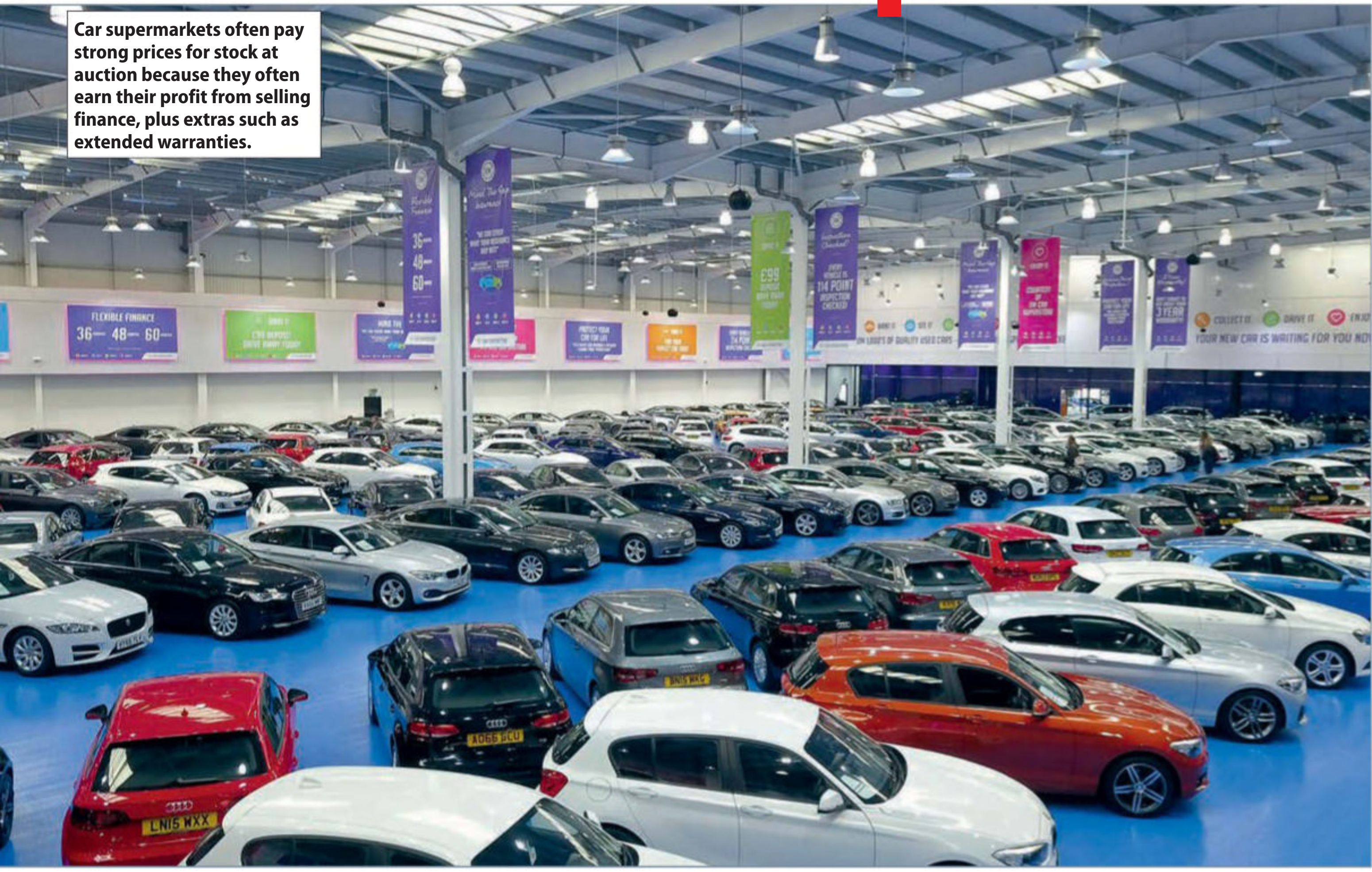


Peter Simpson provides us with an insight into the automotive sales trading world – and beyond.

Where's the profit?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Car supermarkets often pay strong prices for stock at auction because they often earn their profit from selling finance, plus extras such as extended warranties.

If, like me, you're a member of a few 'car dealer groups' on Facebook, you've probably seen more than a few 'where's the profit in that?' type posts, usually with screen grabs of cars which have made what seem like not far off book retail prices at auction. The usual question is why?

Once upon a time, the assumption would be that a retail punter had been bidding – though of course at auction it should take two keen buyers for a high price to be achieved. Nowadays though, BCA and Manheim are to all intents and purposes trade-only, and the high level of charges levied by the big names on occasional buyers mean it's rarely worth someone wanting a car for themselves bothering. Independent local auctions can still be good hunting-ground for private buyers, but results from these don't generally get shared on forums.

I see two things happening. The first is that these days 'book prices' (which, remember were never meant to be more than a guide) aren't always that accurate, and an exceptional car will often sell for well over 'book' in a retail environment. This means dealers will pay more for it. A car might be 'exceptional' due to rarity, condition, or a combination of the two. There are also some specifications that will add more to price than book prices suggest. The classic example, of course, is small low-mileage automatics.

The other big factor that leads to big prices is demand from car supermarkets. These need lots of cars all the time, and while most have their own direct sources, when supply from these is poor, they'll top that up by sourcing stock from auctions. And car supermarkets don't generally make much 'profit' on the unit price of a car. In fact, sometimes a car will be sold at cost. Or even a marginal loss.

That, though, doesn't matter, because having the car to sell unlocks all the additional revenue streams, and these are the principal source of profit for car supermarkets. Add-on extras; extended warranties (which can cost over £1000), paintwork treatments, 'admin charges' and so on. Plus of course the one that everyone now knows all about – the potential four-figure commission that they earn from selling finance!

But if they haven't got the cars to sell, they haven't got the means to earn any of this!

A massive recall

▶ Stellantis UK have, it would appear, identified a major issue with many second-generation Citroën C3s and DS3s made between 2009 and 2016. This, I understand, follows an incident in France when a female driver was killed when a Takata airbag developed a fault while the vehicle was being driven.

Not all vehicles within the age-range have Takata airbags, but owners of vehicles in this age-range should stop driving their vehicle immediately, and check using the VIN check tool on the Citroën UK website **https://www.citroen.co.uk/maintain/safety-recall-check.html** if their vehicle is affected.

Owners are also being contacted by letter, using the DVLA registered keeper information, though this may not happen in cases of vehicles currently listed as 'owned in trade.' There is also a telephone available on 0800 917 9285.

Vehicles included in this action are the second-generation Citroën C3, manufactured between 2009 and 2016, and the Citroën DS3 manufactured between 2009 and 2016.

This is clearly a massive operation. It is unusual for a manufacturer to announce such a huge recall, and for one to apply to vehicles this old – the youngest car impacted is nine years old, the oldest 16. It's understood that 481,000 affected vehicles have already been recalled in France.

From a trader's point of view this has three implications. The first, obviously, is ensuring that any C3 or DS3 within this age-range is checked online and reworked before sale. As noted a moment ago, the recall message doesn't always reach the current owners of 'owned in trade cars.' Stock; the best information DVLA can provide is the name of the first trader in what might well be a line of several before the car gets another registered keeper. The second is to ensure that if a recall repair is needed, the dealer has this done prior to sale. It is illegal for a dealer to knowingly sell a car with an outstanding recall repair and given that dealers are supposed to have specialist knowledge over and above that of private buyers, it would be pretty hard to present a convincing "didn't know about it" argument.

The third implication for the independent trade concerns their responsibility if a car they have sold is caught by this major recall. Does, for example, a dealer have to arrange for the car to be repaired or, more significantly in this case, have any obligation to provide alternative transport while an affected C3/DS3 can't be used. My gut feeling – and sincere hope – is that because this is something a dealer could not reasonably be expected to know about then there cannot be any expected responsibility. But unless or until a case is taken to court, no-one can be 100% certain.

But even if – as I'm 90% sure is the case – the dealer has no responsibility here, I've no doubt that some will feel they should assist as a goodwill gesture. And many more will find themselves wasting loads of time explaining to past customers why it is not their responsibility.

Ghostly goings on?

▶ Talking of Facebook, there are a few sites where, it's alleged, those wanting 'ghost' MOTs – in other words fraudulent tests issued without seeing the vehicle – can supposedly contact those supplying same. It's all totally illegal of course, and any tester foolish enough to offer such a 'service' would, if caught, find that loss of their testing permit is the least of their troubles.

What's more, and contrary to popular belief, persons knowingly buying such a service can face severe penalties if caught, and on top of that selling a car knowing that it has a 'bent ticket' is fraud – pure and simple!

But despite that, what I do find slightly surprising is the number of people who are willing to ask for such a service with their identity revealed. Some seem to be 'wannabe' motor traders; people whose Facebook profile shows a history of occasional buying and selling, while others seem to be people whose car has failed on something expensive such as a DPF issue, and genuinely cannot afford to get it fixed. Occasionally, someone will admit that they "need a test to sell the car." Yes, really!

My gut feeling here is that ghost MOTs do happen. If it wasn't an issue, the DVSA wouldn't be trialling a system of having cars photographed in the testing bay, to prove they are physically present.

However, anyone dishonest enough to want a 'dodgy' test won't get it from one of these sites, and no tester foolish enough to do it will advertise their 'services' in this way. Much more likely they'll pay upfront to someone who then doesn't provide the goods. Who, exactly, are you going to complain to when the entire transaction is 100% illegal, and its impossible for you to have not been aware of this? Another variation is to send you a link to a fake DVSA website showing the test pass, but when you log on to the genuine one, no test pass is recorded. Again, you've been ripped off, but who are you going to complain to?

A ghost MOT in progress? If you break the law by 'buying' one of these online, who will you complain to when the 'seller' doesn't deliver.

I'm pretty sure that photographing cars in test bays will become the norm in the not-too-distant future. This won't, I suspect, be so much as a means of preventing the problem – though it will certainly do that. Rather, it will be all about restoring public faith in the system which had undoubtedly been harmed by the perception of ghost tests being easy to obtain. Even if that perception doesn't really reflect reality.

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CAR MECHANICS

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TOP 40 USED BUYS

on the market from £2000 to £15,000

GUIDE TO BUYING YOUR NEXT VEHICLE in 5 categories

- STATION WAGONS (SUVs with 4WD option)
- ESTATE MODELS
- 60+mpg PETROL CANDIDATES
- ELECTRIC VEHICLES
- PANEL VANS

CAR MECHANICS

SUPPLEMENT

TOP 40 USED BUYS UNDER £15,000

▶ In the first quarter of 2025, used car sales reached a post-pandemic record of more than 2 million cars. It's the sign of a market in recovery, but also one where used cars are arguably more appealing than ever, being longer-lasting, better-built, more feature-packed, and of course a great deal more affordable than increasingly expensive brand-new models.

While the days of truly cheap used cars are now mostly behind us, the used car market has settled down significantly since its post-Covid highs of a few years back and as you'll read over the next few pages, it's amazing what you can get for your money – particularly in a segment we've not really covered before in our used car specials: electric vehicles. With a maximum budget of £15,000, we've chosen forty models across the following five categories:

Station Wagon: We're taking creative liberties a little here with the term, but essentially this is our category mixing five-seat crossovers and SUVs, which put practicality and a raised seating position above all else. All come with a four-wheel-drive option.

Estates: A dying breed in the market, but a good estate can still be a great family car, and most handle better and use less fuel than their crossover counterparts.

60mpg+ Petrol Cars: EVs might steal the limelight but for all-round low-impact motoring, a small, frugal petrol car is about as good as it gets. All our selection can reach 60mpg or more.

Electric Vehicles: The clue is in the name – rapid depreciation has brought some desirable electric models well inside our £15k limit, for a mix of commuters and even long-range models.

Panel Vans: If you need a vehicle for work rather than pleasure, this ever-improving selection of vans should do the trick.

Read on to find out our favourites in each category – and perhaps you'll join the ever-increasing numbers shunning a new car purchase for a more affordable used model.

Antony Ingram

STATION WAGONS (4x4 SUVs)

ESTATE MODELS

60+mpg PETROL CANDIDATES

ELECTRIC VEHICLES

PANEL VANS

AUDI Q5

SPECS	2.0 TDI S line
Engine	1968cc 4-cyl
Power	147bhp
0-60mph	10.5secs
Top Speed	118mph
Fuel	49mpg
CO2	150g/km

▶ It took Audi a full five years to follow its rival BMW into the compact luxury SUV market, the Q5 only arriving in 2008 after BMW had launched the X3 in 2003. But better late than never as they say, and the Q5 certainly wasn't a half measure – it encapsulates all of Audi's qualities into one of the most popular form factors on today's roads and is a used bargain too.

You can spend as little as £2500 on an early Q5, while the very latest and best first-generation models can top our £15,000 budget – with enormous choice in between, along with a smattering of the second-gen 2016-on cars. You just have to bear in mind that, as with several other cars in our station wagon category, some can get hit pretty hard by the 2001-2017 VED car tax structure.

Helped along by Audi's tendency towards evolution rather than revolution, the original car still looks relatively fresh today. The cabin less so, but some would say it's all the better for not being overburdened by screens (there is one, but it's small and integrated into the dash) and using regular analogue dials. And obviously, it feels very well put together.

The Q5's engine lineup is straightforward: turbocharged 2.0-litre four-cylinder petrols and diesels, and a selection of petrol and diesel 3.0-litre V6s. The vast majority on sale use the VW Group's tried-and-tested 2.0 TDI (it's longer-lasting and less problematic than the 2.0 TFSI), with between 141bhp and 175bhp depending on year and spec, most of which will be four-wheel-drive (under Quattro branding). All are old enough now to potentially throw up problems, and the car's weight means it's tough on suspension components, but a well-maintained Q5 should be easy to live with.

BMW X5

SPECS	3.0D M Sport
Engine	2993cc 6-cyl
Power	231bhp
0-60mph	7.8secs
Top Speed	130mph
Fuel	43mpg
CO2	214g/km

▶ BMW's X5 wasn't the first premium SUV – the Mercedes ML beat the original X5 by a few years, and Range Rover by decades – but since its 1999 launch, it's been considered one of the best. BMW built on the original car's talents in 2006 when it released the second-generation X5, known in BMW circles as the E70. The visual similarity was clear but the E70 grew in nearly all dimensions compared to its E53 predecessor and naturally became a little more sophisticated too. The rarely chosen manual gearbox was dropped, all engines were revised or replaced (the 4.8-litre N62 V8 and 3.0-litre M57 turbodiesel inline six stuck around, at least initially), and tech like active anti-roll and a head-up display was available, depending on the model.

You may find some of this when you're hunting on the used market, though in the UK predictably it was the inline six diesels that sold the best, in either SE trim (usually on 18-inch wheels and up, and with contrasting bumper inserts and cladding), or M Sport (19- or 20-inch wheels and above with staggered tyres, deeper colour-matched bumpers and arches). Post-2010 facelift cars have some detail changes and updated engines.

Comfort, handling, and driveability are first-class in the E70 X5 and the cabin is smartly-styled and well-built. Better still, they have a solid reputation for reliability too, in diesel form at least (V8s can be a little more problematic, but running one of those isn't cheap to begin with). Their size means they can chew through tyres (and are susceptible to kerbing damage and parking dents), and fluid leaks are common, but parts supply is good and there's plenty of expertise on fixing common issues, helped by their enormous popularity.

FORD KUGA

SPECS	1.5 Petrol Auto
Engine	1498cc 4-cyl
Power	179bhp
0-60mph	9.8secs
Top Speed	124mph
Fuel	38mpg
CO2	171g/km

▶ Driving enjoyment probably isn't a factor in many family crossover purchases, but Ford's engineers decided to imbue the Kuga with a bit of verve anyway, and it helps the car stand out in an incredibly busy market – whether new or used. It applies just as much to the second-generation Kuga we're covering here (made from 2012 to 2019) as it did to the 2008 original – though sadly the growling Volvo-sourced 2.5-litre turbocharged inline five didn't make the jump…

Instead, you'll find a predictable range of turbo fours (between 1.5 and 2.5 litres) and a pair of diesels, 1.5- and 2.0-litre in capacity. Many are front-wheel-drive, but Ford offered all-wheel-drive on the 1.6 and 2.0 petrols, and some 2.0 diesels. Manual, automatic, and dual-clutch autoboxes were also available.

The choice of used models is pretty mind-boggling thanks to the Kuga's popularity, with prices stretching from just £3000 for the earliest, highest-mileage cars, to £15k-plus for some of the newest cars. The smart money's probably somewhere in the middle, for something that still looks and feels fairly fresh (post-2016 facelift models have a classier appearance) without paying over the odds.

The Kuga's ubiquity does make finding a good, well-maintained car a bit of a minefield, with reliability seemingly varying depending on how well looked-after the car has been in its previous life. While the diesels have a reputation for being challenging to fix (causing big labour bills for some early owners), parts are abundant, so even a car with a few issues may still be economical to repair. A well-maintained Kuga can be a pleasure to live with, and even entertain you on the occasional country road jaunt.

HONDA CR-V

SPECS	2.0 i-VTEC Petrol
Engine	1997cc 4-cyl
Power	152bhp
0-60mph	9.9secs
Top Speed	118mph
Fuel	38mpg
CO2	173g/km

▶ As one of the world's best-selling cars, Honda must be doing something right with the CR-V. The original CR-V arrived in 1995 as competition for the Toyota RAV4 and the pair have been duking it out ever since – and like its rival, the CR-V is about as dependable as used cars get. Take the fourth-generation car, which arrived in the UK in 2012, was facelifted in 2015, and was succeeded in 2017 by the fifth-gen model. During its time on sale, it was a familiar face towards the top of reliability and customer satisfaction surveys, and even the earliest cars are a long way from their twilight years today.

The petrol and diesel engines are about as problem-free as you're likely to find in this class, though clutches can take a beating in CR-Vs regularly used for towing, and DPFs on the 1.6 diesel (branded i-DTEC) can, like many, clog up if the engine never really gets up to temperature.

Don't shy away from the 1.6 though – if you're not planning heavy-duty use, it performs well and is absurdly economical for the car's size (though early ones aren't ULEZ-compliant, if you need to enter these zones). 2.2 diesels are better suited to towing, while both diesels and the 152bhp 2.0-litre petrol were all available with four-wheel-drive.

Honda never really bothered with sporty handling on the CR-V but that's no great shame, as it's a doddle to drive and rides pretty well too, especially if you avoid the larger, more kerbing-prone alloy wheel options. It's tightly-constructed too so it shouldn't be too rattly, and interiors wear their miles well. Pricing meanwhile starts just shy of £4000 for early cars with plenty of miles under their wheels, while our maximum £15k gets a high-spec, low-miles example.

HONDA
EARTH DREAMS
TECHNOLOGY

JEEP GRAND CHEROKEE

▶ Big SUVs are the US car industry's bread and butter, and few have a longer history than those wearing the Grand Cherokee badge. There have been five generations since the original debuted in 1993, with fourth-gen cars currently filling out the middle of the used market, priced from around £6000 and up.

Like its predecessor, the majority of UK Grand Cherokees are powered by a 3.0-litre turbocharged V6 diesel from VM Motori – an engine actually related to the one you'll find in the 2013-on Maserati Ghibli and Quattroporte and the 2016-on Levante – though it's fair to say the Grand Cherokee is quite different from those in other respects.

The 247bhp unit is brawny though and the Jeep's torque, size, weight, and stability make it a great tow vehicle, while four-wheel-drive, smooth-shifting automatic gearboxes, and air suspension mean the Grand Cherokee is relaxing to drive whatever the weather. Or the surface, with Selec-Terrain off-road driving modes and plenty of ground clearance. A mad 700bhp Trackhawk was available, but you won't find one of those for under £15k…

Styling is chunkily handsome, and the interior is straightforward too, with a decently-sized touchscreen but plenty of physical buttons and knobs to go with it. At 4.8 metres long it isn't short of space either.

Electrical issues can affect that infotainment system, and more pertinently the gearbox. The engines though have a good reputation – there are few consistently reported problems even in countries with higher temperatures and heavier usage than most UK cars, though specialists recommend more regular oil changes than the official 12,500 miles – 10k is typically advised.

SPECS	**3.0 CRD V6 Diesel**
Engine	2987cc 6-cyl
Power	247bhp
0-60mph	7.9secs
Top Speed	126mph
Fuel	33mpg
CO2	184g/km

Jeep
3.0L CRD

KIA SPORTAGE

▶ It's not a pretty car, the fourth-generation Kia Sportage sold between 2015 and 2021, but that didn't stop UK buyers snapping up this family SUV in their droves – the Sportage has been a regular feature in top-ten best-seller lists for several years, perfectly matching the practicality, comfort, price and running cost demands of buyers.

Kia's rapid model churn (with models typically only sticking around five or six years) and the even faster two or three-year cycle of UK car-buying means that while the earliest fourth-gen Sportages are only a decade old, pricing starts at under £5000, though you can expect a few scuffs and scrapes for that cash. At the other end of our budget scale, £15k gets 2020 cars with as little as 30,000 miles and contemporary levels of in-car tech.

There was a mix of petrol and diesel models on offer. 1.6 naturally-aspirated petrols were popular for their affordability, while the later 1.6-litre T-GDI petrol had 174bhp at its disposal. A 2.0-litre diesel was available nearly throughout, and the original 1.7 CRDi diesel was replaced at the 2019 facelift with a 1.6 CRDi. The 1.6 turbo petrol, and 1.6 and 2.0-litre diesels all had a four-wheel-drive option, with a standard dual-clutch transmission, though relatively few buyers opted to spend the extra, based on those available today.

Most Sportage woes will be a result of unsympathetic family use and a lax attitude to maintenance rather than inherent issues, though the Kia can't quite match its Japanese rivals for problem-free ownership – even as a relatively new car, diesel engines tended to be more problematic than the petrols, with the usual suspects at fault: clogging DPFs and EGR valves. Cabins are holding up well though; not bad given their family car remit.

SPECS	**2.0 CRDi Diesel**
Engine	1995cc 4-cyl
Power	134bhp
0-60mph	10.1secs
Top Speed	114mph
Fuel	54mpg
CO2	139g/km

LEXUS RX

▶ Lexus upended the luxury car market with the LS400 back in 1989. It didn't quite do the same to the SUV class with the first-generation RX in 1998, though the upscale Japanese brand already had a handle on comfort, build quality, and longevity – and those are all qualities you get from the third-generation RX sold in the UK between 2009 and 2015, and available between around £5000 and £15,000 today.

UK buyers were offered the third-gen RX in just one form, the RX 450h. This used a 3.5-litre petrol V6 paired with the brand's familiar hybrid system, albeit one augmented by a rear-mounted motor for part-time all-wheel-drive. The quoted power, albeit not the figure you get if you simply add everything together, was 294bhp – a decent figure for the late 2000s, and the nature of the hybrid setup enables small periods of all-electric running too.

It's a tidy handler and rides reasonably – air suspension was a common fixture, and is capable of neat tricks like slightly lowering at speed to improve aerodynamics. Not quite enough to regularly hit Lexus's claimed 44.8mpg figure (40-ish is realistic in town, more like 30mpg at motorway speeds), but smooth and quiet running is part and parcel, and the RX is an easy drive – backed up by a cabin that still feels high-quality today.

That quality is shot through the RX. Pre- or post-2012 facelift (spotted by the much larger 'spindle' grille), the powertrain is effectively bulletproof and stands high miles easily, though ensure previous owners haven't skimped on maintenance. Parts can be dear, but you can expect most interior functions to still work – though the infotainment system, controlled by a small mouse-style device, wasn't much cop even when new.

SPECS	450h 3.5 CVT Auto
Engine	3456cc 6-cyl
Power	294bhp
0-60mph	7.6secs
Top Speed	124mph
Fuel	44mpg
CO2	145g/km

HYBRID SYNERGY DRIVE

RANGE ROVER

▶ What was peak Range Rover? Ask that question of enthusiasts of the marque, and there's a solid chance the L322 Rangie would come up – the model developed under BMW ownership and sold from 2001 to 2012. Like other British cars developed under BMW's financial wing, from the R50 MINI to the Rolls-Royce Phantom VII, Land Rover's designers and engineers really understood the assignment when working on the L322. For style, sense of occasion, and driveability, it's still difficult to beat.

The car's long life means there were several changes along the way, the early 4.4-litre BMW V8 being replaced by a Jaguar 4.4-litre V8 in 2005, the 2.9-litre inline six diesel likewise making way for Ford diesel engines from 2007, and reasonably hefty facelifts in 2006 and 2010.

Which one should you buy? Much as the early models are appealing (not least because they start at under £2000), owners recommend 2006-on Ford and Jaguar-engined cars, whose electronics and air suspension are more reliable, and engines cause less trouble. Of the popular TDV8 engines – that's the V8 diesel – the 3.6 and 4.4 have different strengths and weaknesses but are both long-lasting if regularly serviced. The ZF gearboxes in the 2006-on diesels are also reliable units.

The Rangie's all-weather appeal means the earliest have seen more than two decades of winters now and that has begun to take its toll on the bodywork of early L322s especially, so factor that into a cheaper, earlier car too.

A good L322 is an absolute joy though. Interiors look and feel fabulous, and while they're certainly not sporty, they still feel like true luxury cars to drive – on or off road.

SPECS	4.4 TDV8 Auto
Engine	4367cc 8-cyl
Power	308bhp
0-60mph	7.5secs
Top Speed	130mph
Fuel	30mpg
CO2	253g/km

RANGE ROVER

TOYOTA RAV4

SPECS	2.5 VVT-h AWD CVT
Engine	2494cc 4-cyl
Power	194bhp
0-60mph	8.1secs
Top Speed	112mph
Fuel	55mpg
CO_2	127g/km

▶ Another global best-seller like the Honda CR-V, the Toyota RAV4 has a similarly enviable reputation for unburstability. The original laid the foundations for today's roads being awash with vehicles that look like off-roaders but are better suited to pavement, though with four-wheel-drive and decent ground clearance it was a lot more capable, and drove well enough on regular roads that magazines pitched it against contemporary hot hatchbacks. Today's fifth-generation beast is bigger and more sophisticated, but for our £15k budget your greatest choice comes from the 2012-2018 fourth-gen car, which is notable for being the first RAV4 generation to offer hybrid power – as well as regular petrol and diesel variants in the UK.

Opt for the hybrid and you're looking towards the upper end of our budget, and for 2.5 VVT-h badging in the classified ads. The 2.5-litre and electric combo delivers 194bhp, 0-62mph in a snip over eight seconds, and around 55mpg, giving it the edge on the early 2.2 D-4D diesel (49mpg manual, 42mpg auto) if not the 2015-on 2.0 D-4D (up to 60mpg in front-drive form).

Styling isn't as characterful as those early RAV4s but practicality and build quality are up there with the best from the period, cabin and boot space benefitting from it being 100mm longer in wheelbase and 205mm longer overall than its predecessor. 4x4 models can still hack it on trails too, though it's no Land Rover or Jeep-style off-roader. There were a few recalls (for fuel leaks, fuel injectors, and exhaust bolts, depending on the engine and year) but otherwise problems tend to relate to general wear and tear rather than inherent issues. Toyota's parts prices aren't excessive either if you do need to fix things.

VW TIGUAN

SPECS	1.4 TSI 4WD
Engine	1390cc 4-cyl
Power	157bhp
0-60mph	8.9secs
Top Speed	123mph
Fuel	37mpg
CO_2	178g/km

▶ VW might not always be first into a new market segment, but it doesn't often miss when it's there. The Tiguan is a case in point: arriving in 2007 it was a mile behind the likes of the Toyota RAV4 and Honda CR-V, but it sold like hot bratwurst anyway, and the used market is awash with the things – first generation models alone, the one we're focusing on here, start from under £2000 and max out near our £15k ceiling.

Naturally, the kind of car you're getting varies a bit between those two extremes, though handsome, understated styling and a spacious and logical cabin layout are unchanged whatever your budget.

You might be surprised how well early models are coping with their advancing years in fact, at least visually – interiors still look smart well into six-figure mileage and rust isn't a particular problem. That does mean paying extra attention to what a cheaper car might need though – leaf through a car's MOT history and previous Tiguan owners don't seem so hot on keeping on top of tyre changes, suspension bushes, bearings or springs.

2012-on cars received a facelift with a more Passat-like nose and arguably a touch less visual character, along with some trim improvements and refreshed engines. You'll find a similar mix of petrol TSI units (between 1.4 and 2.0 litres) and 2.0 TDI diesels in various states of tune throughout. Manuals are slightly more common than automatics (both conventional and DSG), and Haldex four-wheel-drive is typically found on the more powerful diesels. Diesels are long-lasting, while the Haldex likes 20,000-mile or three-year oil changes. A good Tiguan though still makes a fine family car or winter workhorse.

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BMW 5-SERIES TOURING

▶ The baton has passed from the E61 generation BMW 5-Series Touring to the F11 as the smart wagon of choice, and in more ways than one. While the E61's styling arguably looks better today than it did when new, the F11's more subtle lines are ageing particularly well, almost looking like more of an evolution of the old E39. There's plenty more to recommend the F11 too though. Being an estate, boot size is obviously important, and the F11's luggage space grew to 560 litres, up from 500 litres in the E61. Interior quality improved too – and again, the dashboard design is a little more straightforward than that of its more experimental predecessor.

Engine choice is vast: petrols range from a 2.0-litre turbocharged inline four (the 520i) to the N55 3.0 turbo inline six (535i), the N63 twin-turbo V8 (550i), and an N55-based ActiveHybrid 5 – though sadly, no M5 Touring with this generation. Diesels stretched from a 518d to the mad 375bhp, 546lb ft M550d. The very best F11 Tourings break through our £15k limit but choice below that is still huge, with the 520d by far the most abundant; scruffy but serviceable F11s start around £6000.

F-chassis 5-Series are getting to the age where more focused maintenance is becoming necessary, but they're otherwise fairly dependable – with the caveat that 2014-on B47-engined diesels are preferable to earlier N47 engines. Rattling timing chains are a precursor to failure. BMW's distinctive LED 'corona' lights can fail, and old plastic grommets can lead to water in the boot, which can play havoc with electrical components, so inspect any potential purchase for dampness.

SPECS	520i Auto M Sport
Engine	1997cc 4-cyl
Power	181bhp
0-60mph	8.1secs
Top Speed	137mph
Fuel	40mpg
CO2	160g/km

FORD FOCUS

▶ For how popular the Ford Focus Estate is on the used market, it's baffling that Ford is ditching regular cars like the Focus from its lineup – but then the same could be said of the Fiesta; Ford of Europe just struggles to make money from normal cars, it seems. The Focus Estate is very normal indeed, but we don't mean that as a criticism – it's simply a car that happens to do everyday, regular things very well.

We're primarily looking at the fourth-generation Focus here, the estate debuting alongside the five-door hatchback in 2018. These cars are already abundant from around £8000 (mixed in with some of the best third-generation cars, with the hot ST versions of that model also starting around here) with a relatively large choice of engines mixed in – the range starts with 1.0 EcoBoost petrols and 1.5 EcoBlue diesels, rising through 1.5 petrol and 2.0 diesels, and topping out with the 2.3-litre Focus ST Estate with 276bhp.

The fourth-gen's styling is more flowing than the third-gen car and the cabin has a classier look and feel too, while the infotainment screen (now a freestanding unit) runs on a later, quicker and more intuitive Ford SYNC system. A 575-litre boot is a little small by class standards, but more practical than the hatch. On EcoBoost models it's worth checking whether cam timing is by belt or chain. Ford introduced a chain version of the engine around 2019/2020 which should prove more reliable long-term than the older models. Petrol particulate filters can clog in both 1.0 and 1.5 cars and throw up an error message, and there have been recalls for child locks, suspension bolts, the wiring loom, fusebox, and seat anchorage bolts, so ensure all have been attended to.

SPECS	2.0 EcoBlue
Engine	1995cc 4-cyl
Power	147bhp
0-60mph	8.4secs
Top Speed	129mph
Fuel	59mpg
CO2	125g/km

JAGUAR XF SPORTBRAKE

▶ It took Jaguar until 2004 to create an estate car, with the X-TYPE Estate, and it has only offered two since, based on each generation of the Jaguar XF. Called the XF Sportbrake, it's a classy alternative to a BMW 5-Series Touring or Mercedes E-Class Estate, and within our budget you'll find a mix of both generations, the pre-2015 'X250' and the 2015-on 'X260'.

The Sportbrake debuted in 2012, with a range of four- and six-cylinder petrol and diesel engines – plus belligerent XFR and XFR-S versions powered by a 5.0-litre supercharged V8, though you'll struggle to find one of those for under £15,000. The X260 meanwhile is a little more down-to-earth, being four-cylinder almost across the range (under JLR's Ingenium branding) – though strike it lucky and you may find one of the V6 diesels.

Ride and handling are up to Jaguar's usual standards, especially on some of the smaller wheel options which cope better when things get really craggy. The vast majority use an eight-speed ZF automatic, though a tiny handful of economy-biased entry-level cars came with a manual. Reliability has been mixed but they're far from being the worst JLR products in this regard. Opting for a later X250 rather than an earlier X260 may work in your favour, as electrical problems aren't unknown on earlier X260s, while the 2.2-litre diesels have a better reputation than the early 2.0 Ingenium units – the latter can have timing chain issues, though once sorted it's a more economical engine than the 2.2. Both models had a laundry list of recalls, so check that all issues have been addressed, and watch out for infotainment glitches on both generations. Buy well though, and the XF can be a pleasure to own and drive.

SPECS	**2.2d Sport Auto (8)**
Engine	2179cc 4-cyl
Power	197bhp
0-60mph	8.2secs
Top Speed	140mph
Fuel	52mpg
CO2	139g/km

KIA CEED SPORTSWAGON

▶ Before looking at a third-generation Kia Ceed Sportswagon, ask yourself how much space you actually need in your estate. 31 litres of capacity and a slightly more generous boot aperture are all that separate the Sportswagon from the more stylish Kia Proceed of the same generation. Kia called the latter a shooting brake, but the more rakish roof doesn't do much to impede upon practicality. So while we're covering the Sportswagon here, most of this will also apply to the Proceed if you're so inclined. The Proceed misses out on the smallest 1.0-litre T-GDi and adds a 201bhp 1.6 T-GDi petrol, befitting its sportier billing, but otherwise both get 1.4-litre and 1.5-litre (from 2021-on) four-cylinder petrols, and a 1.6-litre CRDi turbodiesel, while some later petrols have mild-hybrid assistance.

Trim lines are a mess of numbers, though you'll find plenty of sporty GT-Line models too (and top-line GT trim on the Proceed, with the 201bhp engine), with six-speed manual and seven-speed dual-clutch autos across the range. All Ceeds drive well – closer to the mature feel of a Golf than the sporty nature of a Focus – while build quality is generally good too.

Beyond a vacuum pump recall for some 2018-2020 cars, and reports from owners with various small electrical gremlins, the 2018-on Ceed (and by extension the Sportwagon and Proceed) doesn't have any major recurring issues, despite some equivalent models in the United States having a pretty shaky reputation for engine reliability. Our £15k budget will get you into a very well-kept 2022 or 2023 car, while prices as a whole start around £5000, and upwards of £7000 for the Proceed.

SPECS	**1.0 T-GDi petrol**
Engine	998cc 3-cyl
Power	118bhp
0-60mph	11secs
Top Speed	118mph
Fuel	50mpg
CO2	127g/km

MERCEDES-BENZ C-CLASS

▶ It might not have the 'old money' image of the classic S123 and S124 generation Mercedes estates, but the Mercedes C-Class Estate still has a classy image. Mercedes hasn't forgotten about plain and simple practicality over the years either, as the S205 C-Class Estate launched in 2014 has 490 litres of boot space, on a par with its F31 3-Series Touring and B9-generation Audi A4 Avant contemporaries – with over 1500 litres of space when the rear seats are folded. The fourth-generation C-Class was well-received when new. It was another step in the right direction in terms of quality, after the brand's late 1990s mis-steps, and even a decade on from launch a C-Class Estate should feel like it has plenty of life left in it.

That perception doesn't always tally with the car's reliability – electrical faults are commonplace and fit and finish could still be better in some areas – but conversely, the W205 (and by extension the S205 Estate) are proving mechanically robust, especially that old Mercedes area of expertise, the diesels. Pick a 220d with the brand's OM651 engine and treat it to regular oil changes, and big mileage figures are on the cards.

You should enjoy driving it too. The S205 is a little smoother-riding than many of its contemporaries and refinement is excellent too. In this price bracket you won't find the AMG C43 and C63 models but most four-cylinder petrols and diesels should crop up, from as little as around £6000 (intersecting with the previous-generation S204 Estate), while our £15k maximum turns up cars as late as 2020 and with as little as 30,000 miles. Almost all will be automatic, though manual was available, as was 4Matic all-wheel-drive.

SPECS	**C200 BlueTEC**
Engine	1598cc 4-cyl
Power	134bhp
0-60mph	9.8secs
Top Speed	133mph
Fuel	65mpg
CO2	109g/km

PEUGEOT 308 SW

▶ Why does the Peugeot 308 SW seem to have flown under the radar? Perhaps it's the styling, which is handsome but somewhat understated, especially compared to Peugeot's current range with their tiger-claw headlights and tail lights, intricate grilles, and complex panelwork. Indeed, 2021-on 308s have adopted some of those touches and look a little busier than the 2013-2020 models as a result. Likewise, modern Peugeot interiors are a whole different world from this car's cabin, though the 308's interior is one thing you might take a little while to get used to even so. It adopts the brand's 'i-Cockpit' layout, which basically means high-set dials and a small, low-set steering wheel – an arrangement some drivers find can block their view of the dials.

Another detail you'll have to get used to is the touchscreen, which you need to use for most audio and aircon functions – and predictably, this is the source of some 308 problems. Owners have taken to simply replacing it with a used item, since it's not so deeply integrated that any driving-critical functions are affected. 2020-on cars also get a digital instrument cluster. Not only is there plenty of space for passengers, but the 660-litre boot is very competitive – bigger than most in its class and even some larger estates. The 308 isn't bad to drive either, as that tiny steering wheel has quick responses, yet the ride quality is effective at filtering out broken surfaces too.

The 308's 1.2 PureTech petrol is one of the infamous 'wet belt' engines which are highly sensitive to both oil and belt changes. The 1.6 petrol 'Prince' engine can suffer carbon buildup and timing chain tensioner issues, while the 1.5 HDi also suffers timing chain problems – leaving the 2.0 HDi the best choice for longevity.

SPECS	**2.0 BlueHDi**
Engine	1997cc 4-cyl
Power	147bhp
0-60mph	8.9secs
Top Speed	130mph
Fuel	72mpg
CO2	102g/km

SKODA OCTAVIA

▶ For practicality, utility, comfort and dependability, the Skoda Octavia Estate is difficult to beat at its price point. From its very first generation the Octavia has punched well above its weight, typically offering greater space than others for similar money, and that continues right up to the current model.

You can find examples of the latest 2019-on car for our budget (they start from around £10k), but the widest choice is of the previous third-generation car, sold from 2012-2019. 2017-on facelift cars are easily identifiable by their four-headlight look, but there's not much to choose between cars built before or after this date otherwise.

Skoda offered a wide range of engines in the model. The sensible money is on one of the many 2.0 TDI variants, which pair useful performance with an easy 50mpg-plus – and if you're feeling racy, this engine came in 181bhp form in the sporty vRS, with the option of four-wheel-drive. The plastic-clad, raised-suspension Scout was also offered with four-wheel-drive and handles rough roads with aplomb.

There was also a 1.6 TDI, plus a full range of petrols, from a 1.0-litre three-cylinder to the 241bhp EA888 2.0-litre of the petrol vRS. A sensibly laid-out, well-built interior and 610-litre boot are other Octavia qualities, as is an intuitive infotainment system (whose screen expanded in size and clarity as the years went on) and composed ride and handling – though the vRS does feel a little too firm sometimes. And yes, this generation Octavia is still pretty dependable. There have been several recalls, but an Octavia isn't likely to leave you stranded, aftermarket expertise is about as good as it gets thanks to the VW mechanicals – a well-maintained diesel in particular should go on near-indefinitely.

SPECS 1.6 TDI CR

Engine	1598cc 4-cyl
Power	103bhp
0-60mph	10.6secs
Top Speed	119mph
Fuel	74mpg
CO2	99g/km

TOYOTA COROLLA

▶ We're covering the Toyota Corolla Touring Sports here on the basis that it's one of few estates in this guide available with hybrid power. Among used estates under £15,000, petrol and diesel are pretty easy to find, but while hybrid tech has become increasingly popular in the new market, it's still limited to only a handful of models when you're on a lower budget.

£15k will get you a Corolla Touring Sports as late as 2020 or 2021, using either Toyota's 1.8-litre or 2.0-litre four-cylinder hybrid drivetrain, while prices start at around £10,000. You can however go cheaper and still get a hybrid Toyota wagon, since prior to the Corolla Estate, Toyota offered the Auris Touring Sports from 2013, with many of the same qualities, and prices from around £5000.

Back to the Corolla though, which is built on Toyota's TNGA platform, and is therefore closely related to cars like the brand's Prius, C-HR, and Lexus UX. Refinement and capable (if not entertaining) handling are part and parcel, as is a typically Toyota feeling of solidity and an uncomplicated dashboard layout. Toyota's infotainment screen isn't the most responsive and can have the odd glitch, but should pair to your mobile phone with minimal effort.

The 1.8-litre hybrid develops 121bhp (138bhp from 2022-on), while the 2.0-litre has a decent shove thanks to a 178bhp output (193bhp from 2022) – and both have claimed economy figures of more than 60mpg. Fuel isn't the only place you'll be saving money either, as Toyota's hybrids continue to enjoy a strong reputation for reliability. There have been a handful of recalls over the years – but simple maintenance should keep the Corolla going long into the future.

SPECS 2.0 Hybrid CVT

Engine	1987cc 4-cyl
Power	193bhp
0-60mph	7.5secs
Top Speed	111mph
Fuel	60mpg
CO2	107g/km

VAUXHALL ASTRA SPORTS TOURER

SPECS	1.4T 150 SRi
Engine	1399cc 4-cyl
Power	147bhp
0-60mph	8.2secs
Top Speed	133mph
Fuel	43mpg
CO2	139g/km

▶ The Astra Estate – or Sports Tourer, to use its official name – is a classic workhorse estate. Driving excitement and visual frippery are both in short supply, but for straightforward usability, comfort, and high standards of build quality, the Astra scores highly. For sub-£15k, we're looking at the Sports Tourer variant of the Astra 'K', launched in 2015 and replaced by a Peugeot 308-based model in 2021 following Stellantis ownership of the Vauxhall marque. You may find one or two of these later Astras in our budget but there's far greater choice of the earlier car, with a mix of models including 1.2 and 1.4-litre turbocharged petrols, and 1.5 and 1.6 turbodiesels.

Reliability-wise, all fall under the banner of 'unlikely to leave you stranded, but might throw up annoying fault codes and electrical bugs'. Mechanically the Astra is proving fairly dependable, and its sheer ubiquity means parts supply won't be an issue for a long time to come. In other respects, the Astra is an easy-going companion. The all-important boot is smaller than some at 540 litres, but still usefully shaped, and some models had a motion-activated tailgate – if the car you're looking at has that, ensure it works with a wiggle of your foot under the rear bumper. Passenger space is generous, and it's refined on the move – like a lot of Vauxhalls, the Astra comes into its own on motorways, with a solid and stable feeling, and well-shaped seats, which make it easy to while away the hours.

VOLVO V60

SPECS	D5 Diesel 205PS
Engine	2400cc 5-cyl
Power	202bhp
0-60mph	7.6secs
Top Speed	143mph
Fuel	52mpg
CO2	142g/km

▶ You'll find a mix of Volvo V60s below our £15,000 budget. From around £10,000, you'll be looking mostly at devilishly handsome post-2018 car, while a little above £10k but mostly below is the first-generation 2010-2018 model. Smart-looking though the later version is, the earlier car is possibly the more interesting – not just for its more accessible pricing, but also its more compact proportions, novel interior design, and its much broader engine choice: it came with four, five, and six-cylinder petrol engines, four and five-cylinder diesels, and plug-in hybrids with an electrically-powered rear axle.

Unfortunately, you won't find the petrol six within budget, as it was limited to the high-performance Polestar. But the inline-fives feel like a real novelty today, for their sound and smoother delivery than the equivalent four-cylinder engine.

The four-cylinders aren't quite as beloved by Volvo enthusiasts and the V60 as a whole has a long recall list to pore over, but they're not overly problematic cars. Just keep on top of fluid changes, particularly in the automatic transmissions – like most such units, service intervals are optimistically long.

Ironically for a Volvo estate the only real area the V60 falls notably short on is boot space – there are some conventional hatchbacks that give you more than 430 litres. Treat it as a generously-sized hatch though and you probably won't mind, particularly as the driver gets one of the best seats in the business – this is a car you can cover hundreds of miles in and still get out feeling fresh. The TFT instruments are smart, the floating dash design a little busy, and the handling strait-laced, but the V60's solid feel, light steering and hushed cabin all make it relaxing to drive.

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FIAT 500 TWINAIR

SPECS	0.9 TwinAir
Engine	875cc 2-cyl
Power	104bhp
0-60mph	9.7secs
Top Speed	117mph
Fuel	67mpg
CO₂	99g/km

▶ There's a big asterisk alongside the Fiat 500 TwinAir as a 60mpg-plus car. Read Fiat's sales literature, and that's exactly what was promised: a fuel consumption figure of 67mpg, pretty remarkable from something that doesn't combust diesel or have hybrid assistance. But in the real world, the TwinAir isn't quite so frugal, with economy closer to 40mpg – or even less if you've got the footwork of a tarmac rally driver.

Rather than Fiat telling massive fibs, the TwinAir's drinking problem is more of a psychological thing. It's undoubtedly a clever engine, a parallel twin displacing 875cc, with hydraulic variable valve timing to control airflow allowing Fiat to do away with a conventional throttle butterfly. With a turbo bolted to the exhaust manifold, it promised either 84bhp or up to 104bhp, and both models delivered the all-important sub-100g/km CO_2 figure for free road tax at the time.

The unusual layout delivers an offbeat engine note, and this is where the economy problems begin. Drive at low revs, where the engine's at its most frugal, there's not much pull and it constantly sounds on the verge of stalling, like a four-cylinder engine lugging far too low. So, you rev it a little higher, burning more fuel… and then rev it higher again and really get that turbo working, because the TwinAir's also great fun to thrash, burbling away like no other modern petrol engine. Net result: fuel economy tumbles.

Still, it's easier to be light-footed in the 500 and its similarly lightweight Panda sibling than in the Fiat Punto or Alfa Romeo MiTo that also used the TwinAir engine. And the rest of the 500 package was, and still is, quite appealing: retro styling inside and out, dozens of different paintwork and trim colours, and an airy cabin courtesy of plenty of glass. Not everyone will get on with the high driving position and the centre console jamming into their thigh, but the high-set gearshift is great, just a hand-span away from the steering wheel and providing even more encouragement to rev the knackers off the little two-pot.

The 500 TwinAir seems to take such behaviour in its stride too. The engines are proving reliable even more than a decade on from launch, though they're sensitive to using the correct oil, since it doesn't just serve as a lubricant, but requires the correct oil pressure to actuate the MultiAir valve timing. Predictably, advice on what is 'best' varies, so err towards either the handbook or advice of those who work on them here.

As one of the default first-car choices, 500s of any kind can look a bit battered and bruised after years of being pinballed between kerbs and other street furniture, but in general they wear their miles well for a small, cheap car. Clonks from suspension bushes are common, as are tired dampers and worn clutches. Air-conditioning systems have a habit of failing too, but parts for any 500 are plentiful and fairly cheap.

FIAT
twin air

HONDA JAZZ 1.5 i-MMD HYBRID

SPECS	1.5 i-MMD eCVT auto
Engine	1498cc 4-cyl
Power	107bhp
0-60mph	9.1secs
Top Speed	108mph
Fuel	63mpg
CO2	102g/km

▶ Our 60+mpg list is full of deeply sensible transportation options, but the Honda Jazz might be the most deeply sensible of all. If "get a Golf" is the common refrain for anyone looking for a family hatchback, then "get a Jazz" is probably its equivalent in the supermini sector, since the one-box Honda has become a byword for both reliability and practicality.

If you want to add miserly fuel economy to that equation, then the 1.5 i-MMD Hybrid, offered in the fourth-generation model from 2020, is the model to go for. Honda had offered hybrid versions of the previous two generations of Jazz but the latest i-MMD system is the most sophisticated yet, using the car's 1.5-litre petrol engine primarily as a generator, with a 107bhp electric motor handling propulsion.

That arrangement nets you up to 62.8mpg on the WLTP cycle in Elegance trim, a figure the car seems happy enough to replicate in real-world driving – with the potential for more if you're using it to toddle around town. The Jazz does that pretty well too, with brisk off-the-mark performance, light steering, and great visibility from the glassy cabin and upright driving position.

The Jazz has long been among the more expensive cars in its class brand new, but used versions take the sting out of that somewhat, with 2020 models now dipping below the £10,000 mark. For this you can expect something that still looks and feels pretty fresh even as mileage passes 100,000 miles – cabin quality is more than up to the rigours of family use (more than justifying those high prices) and Honda long ago figured the knack for making switches that still feel good to click however many times they have been used.

The fourth-gen Jazz does include a touchscreen, which wasn't among the best to use when new and will feel even more outdated several years down the line, but thankfully it's not of the sort that forces you to use it to adjust temperature or volume – there are still knobs and switches for that. A My Honda+ app lets you locate your car or lock and unlock remotely, and there have been no notable issues so far with either the touchscreen or the app beyond the occasional temporary glitches that can affect virtually any software.

Nor the rest of the car. Like previous Jazz generations, stretching back to the first car launched in 2002, the Jazz has been a regular towards the top of reliability and customer satisfaction surveys. There's been just a single recall at the time of writing, and it's about as innocuous as they get, for the forward parking camera failing to turn on in the correct way. Otherwise, apply all the usual supermini checks: all the cameras and great visibility in the world don't stop Jazz owners clattering into kerbs and parked vehicles, so factor any damage into the price you pay.

MINI ONE 1.2

▶ You don't need a Works GP, JCW, Cooper S, or even a Cooper to enjoy the third-generation 'F56' MINI hatchback – there's plenty of joy to be found even in the basic MINI One, with nary a racing stripe nor contrast colour roof to be found. Or even alloy wheels, depending on how many boxes the original buyer ticked.

What you do get is a 1.2-litre variant of BMW's B38 turbocharged inline three-cylinder petrol, an engine more commonly found in everything from other MINIs to 1-, 2- and 3-Series of the mid-2010s and onward, and even the BMW i8. Naturally, it doesn't have quite the same brawny power output of some of those other applications, but its 101bhp only had 1090kg to lug along – a figure that not many modern cars dip underneath – so it just snuck under the 10-second mark in the 0-62mph sprint as a result. More pertinently, it achieved our 60+mpg goal, with an official 61.4mpg, and 108g/km of CO_2.

Better still, the 1.2-litre MINI One has that characteristic fizziness of all MINIs, the three-cylinder soundtrack giving it a bit of character and the skinny 175-section, 65-profile tyres on 15-inch wheels giving both the handling and ride a light touch – though naturally, many owners upgraded to 16-inch wheels with slightly more rubber back in the day, for more style and extra grip (according to the salesperson rubbing their hands for the commission).

Some owners also opted for things like an infotainment screen, a three-spoke sports steering wheel, and fancy metallic colours, though if you're tempted by any of those, you might also simply want to trade up to a Cooper, prices of which don't start a great deal higher than the £4000 starting point of the One. At around £10,000, you'll start finding the later 2018-on MINI Ones, which moved to a detuned version of the Cooper's 1.5-litre three-cylinder, which made identical power but a little more torque (140lb ft, to the 1.2's 133lb ft).

Group 12 insurance is another factor that'll keep costs down, compared to the Cooper of the day which immediately jumped to group 18, so the One makes sense as a car for new drivers or for those on a shoestring budget. And in terms of cabin quality, if not features, there's not a lot to separate the basic model from JCWs at many times the price. F56 MINIs have a chunky, long-lasting feel too.

The F56 also has a considerably better reputation than the oft-maligned R56 predecessor. The old Prince engine went in the bin, and its B38 replacement is proving generally reliable. Most anecdotal evidence on B38 ownership seems to be for the 1.5-litre engine in BMWs, but on the basis that no news is good news, the relatively under-stressed 1.2 should prove easy enough to own, if subject to the same cramped and maintenance-unfriendly engine bay as all MINIs. F56s can eat engine mounts, but rust shouldn't yet be an issue.

SPECS

	1.2 One Hatchback
Engine	1198cc 3-cyl
Power	100bhp
0-60mph	9.6secs
Top Speed	121mph
Fuel	61mpg
CO_2	108g/km

SUZUKI SWIFT BOOSTERJET

▶ The third-generation Suzuki Swift is a real hidden gem. Its 2004 and 2010 predecessors were impressive in their own right, both far closer to class-leaders like the MINI, Ford Fiesta and VW Polo than you'd credit, but the 2016-2023 model is arguably even better, feeling more grown-up and sophisticated yet making big strides in economy at the same time.

One thing that separates the 'A2L' Swift from its predecessors, and indeed most other cars in its class and the wider industry, is that despite all the extra technology and safety gear Suzuki crammed into its new 'Heartect' platform, it was a lighter car than its predecessor. Significantly so too – by around 10%, model for model. The lightest Swifts came in at a remarkable 890kg, while even the Swift Sport, with its 1.4-litre turbocharged engine, nipped as low as 975kg. Somewhere in the middle was the fuel economy champ we're focusing on here, the 1.0-litre Boosterjet. It's pretty featherweight too, at only 915kg – a good 100kg less than a contemporary Fiesta – while its turbocharged three-cylinder engine is good for 109bhp, 0-62mph in a swift (sorry) 10.6 seconds, and 61.4mpg combined. A mild-hybrid version, badged SHVS (for Smart Hybrid Vehicle by Suzuki) matches the regular Boosterjet's power and acceleration figures but bumps economy up to 65.7mpg.

It's no mere marketing guff either, as the Boosterjet will happily return 60+mpg if you're light-footed, and well over 50mpg even if you're not. The lack of mass clearly helps and gives the Swift a lively feel in the corners too – for driver appeal this generation Swift was right up there on the podium with the Fiesta and MINI. The SZ3, SZ-T and SZ5 trim line structure was a little confusing, but equipment was generous on all (air-conditioning and a leather steering wheel were standard from the off), while the SHVS model was limited to top trim only. Post-2021 cars got LED headlights as standard.

SPECS **SZ-T 1.0 Boosterjet**

Engine	998cc 3-cyl
Power	109bhp
0-60mph	10.6secs
Top Speed	121mph
Fuel	61mpg
CO2	104g/km

While the 1.2-litre non-turbo Dualjet engine was effective and frugal, and the more powerful Sport introduced in 2018 is a hoot on a twisty road, the popular Boosterjet really is the pick of the third-gen Swift range. The Swift is as familiar a sight near the top of reliability surveys as its Honda Jazz and Toyota Yaris compatriots, and the Boosterjet engine appears to have no significant gremlins even at higher mileage – there was a recall in 2018 for the mild-hybrid for a starter-generator belt that was prone to snapping, but that's pretty much it.

With a timing chain, the K10C engine has none of the wet-belt nonsense you get with some similarly-sized engines from Ford or Stellantis, either, which bodes well for its long-term durability. Just keep an eye out for underbody corrosion: Swifts shouldn't be riddled with holes just yet, but the simple stamped steel suspension components and subframes may already have quite a lot of surface rust if they've seen a lot of winter use.

BOOSTERJET
SUZUKI

TOYOTA YARIS HYBRID

▶ While our £15,000 budget will secure you older examples of the current-generation, hybrid-only Yaris, the richest pickings on the used market are for the previous-gen model, which introduced hybrid power to the Yaris platform – and in Europe at least, introduced more people to Toyota's hybrid technology than the Prius.

The first Yaris hybrid arrived in 2012, promising official combined economy of 80.7mpg on the old NEDC cycle. WLTP ratings revised this down to 58.9mpg in 2019, and while this is just shy of our 60mpg requirement, we can probably cut the Yaris some slack, as it'll hit 60mpg in the real world pretty easily, and you have to be leaden-footed or spend all day at motorway speeds to see less than mid-50s.

The Hybrid has held its value spectacularly well over the years, and you'll still pay around £6000 for one of the earliest cars – a pretty hefty sum when a Fiesta of equivalent age will barely trouble you for a couple of grand. But the car's durability and the hybrid system's reliability both go some way to justifying the premium. Low-miles cars and those in fancy GR-Sport trim can nudge into our £15k limit, but at that price it's competing against the current model, prices for which begin at around £11,500.

These 2020-on cars feel more substantial, offer greater performance and economy (up to 68.9mpg), and are more engaging to drive than the earlier car, helped by a thrummy 1.5-litre three-cylinder engine rather than the earlier car's 1.5-litre four. But the older car is still pleasant to pilot, being far quieter at urban speeds than a diesel equivalent and only really getting vocal if you're gunning for the quoted 11.4-second 0-60mph time.

The Yaris range received a slightly ungainly facelift in 2014 to bring it in line with some of Toyota's other models at the time, but mechanically it remained largely identical throughout production, differentiated mainly by trim lines and colour choice, plus a gradual improvement in the infotainment screen embedded in the dashboard. As a result, mileage and condition are more important than age, and really mileage isn't that big a deal either as the hybrid drivetrain seems to go on indefinitely provided servicing hasn't been neglected.

And reliability is a big part of why you might opt for the Yaris in the 60mpg club. No car is faultless, but the Yaris Hybrid gets closer than many. The biggest risk is that previous owners read a little too much into the car's reputation for dependability and skimp on servicing, particularly the recommended 5000-mile or half-yearly oil change, perhaps a corollary (no Toyota pun intended) of the frequent on/off cycles the engine in a hybrid goes through. Some owners have reported the infotainment system going blank, and suspension clonks, but corrosion isn't a major issue on this generation of Yaris, beyond a smattering of surface rust on suspension components and ancillaries.

SPECS 1.5 VVTi Hybrid CVT

Engine	1497cc 4-cyl
Power	98bhp
0-60mph	11.4secs
Top Speed	103mph
Fuel	81mpg
CO2	75g/km

80
100
60
120
40
140
20
km/h MPH
PWR
ECO
CHG
937
280
1/1

YARIS
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BMW i3

SPECS	Standard Trim
Power	167bhp
0-60mph	7.0secs
Top Speed	93mph
Torque	250Nm
50kW 0-100%	1.5hrs
Energy	3.3-4.4 miles/kWh

▶ Just £6000 is the starting point for one of the most distinctive electric cars on the road, and also one of BMW's boldest cars this century. While 250,000 cars sold between 2013 and 2022 is hardly a failure, the i3 is another example of the market not being quite ready for a car – just as it wasn't with the i3's spiritual predecessor, the Audi A2, when that arrived in 2000. It's fair to say that the i3's appeal was limited for the same reasons as most early electric cars: it was expensive, and its range was a real limitation to customers more familiar with petrol, diesel and hybrid cars that could take you hundreds of miles on a fill-up.

In its original 2013-2016 form maximum range is 120 miles. BMW also offered a range-extender model, with a 647cc parallel twin petrol engine contributing to a combined 186 miles – though this was dropped when the 2017 car gained a larger battery taking range to a more useful 190 miles.

A surprisingly low-drag shape and narrow tyres mean the i3 is efficient in real-world use, though as the i3 ages, charging cycles and degradation of the battery will also chip away at its maximum capacity, as will cold weather, so you can expect well under 100 miles from a charge in earlier models too.

The i3's fun to drive and even better to sit in, with a cabin that still looks fresh today. It's generally reliable too, though when things go wrong, the i3 doesn't do it by halves. The i3's battery is directly cooled by the refrigerant of the air-conditioning system, which means a failure of the A/C compressor can fill the narrow cooling channels with debris, and necessitate replacement of the entire circuit, for a bill that makes battery replacement look like no big deal.

HYUNDAI IONIQ

SPECS	28kWh auto
Power	118bhp
0-60mph	9.9secs
Top Speed	103mph
Torque	295Nm
50kW 0-80%	30mins
Energy	4.5 miles/kWh

▶ This isn't the retro-futuristic Ioniq 5, nor the 1930s streamliner-inspired Ioniq 6. The original Hyundai Ioniq, with no numerical suffix, is more recognisable as a Prius-style hybrid beloved of minicab drivers, but the Ioniq line was launched simultaneously as a plug-in hybrid and fully electric vehicle too, and made its debut in 2016.

It was a car with the typical good sense we've come to expect from Hyundai. It was adequately powerful, better to drive than a Nissan LEAF, more affordable than an e-Golf, and offered an NEDC range of 174 miles, which was pretty impressive at a time when many EVs struggled to return 100 miles.

A sport mode gave the Ioniq some pep in day-to-day driving and was matched by neat handling (despite the torsion beam axle at the back, compared to the more sophisticated multi-link of the hybrid versions), and Hyundai offered steering wheel paddles for variable braking regen, the strongest setting just about allowing one-pedal driving.

Externally the electric Ioniq can be identified by its rather flat-looking grille treatment and a solitary badge on the back, while inside it got bronze-coloured trim accents and a raised centre console with a large cubby in front, rather than the more conventional arrangement of the hybrids.

Today the price of entry is around £8000 – similar to the hybrid models. They were built until 2022, so some will still be within Hyundai's five-year warranty. The Ioniq has been subject to coolant leak and power relay recalls, and for a car with a 28kWh traction battery, owners have ironically had more problems with the regular lead-acid 12V accessory battery. Otherwise, Hyundai's first Ioniq is proving usefully dependable.

JAGUAR I-PACE

SPECS	EV400 AWD auto
Power	395bhp
0-60mph	4.6secs
Top Speed	200mph
Torque	696Nm
50kW 0-80%	1.5hrs
Energy	2.9 miles/kWh

▶ Grace, space and pace? The Jaguar I-PACE definitely has the latter pair, and while it might not be as graceful as an XK120 or Series 1 XJ, Jaguar's electric crossover, styled under the guidance of Ian Callum, is still a fresh shape on today's roads, despite it first emerging in 2018. In the right colour and on the right wheels, you could even call it quite desirable.

It was also quite bold by Callum and Jaguar to abandon the brand's traditional long-nose proportions, but the shape did a pretty good job of hiding the extra height required to sling a hefty 90kWh battery pack underneath. It's not even really an SUV – at 1565mm tall, it's lower than a Nissan Qashqai.

The chunky battery gave the I-PACE a 292-mile WLTP range, among the best on the market back in 2018, and enough to deliver a real-world 200 miles today. The Jaguar quality of pace comes courtesy of front and rear motors delivering a combined 395bhp, while the near one-box form is pretty good for space, too.

Today the I-PACE is a lot of car for the money, with prices starting at a shade over £10,000 for the earliest cars and 2020 models still dipping under £15,000 – the price of a new Dacia Spring. Ride and handling are both more than up to Jaguar standards, and while the cabin is a little dull (and a little too reliant on screens and capacitive buttons) if you grew up with the trad wood and cream leather, it's comfortable and feels solidly-built.

Jaguar's spectre of mixed reliability can haunt the I-PACE too. Even the earliest models should still be within their eight-year battery warranty, but make sure any car you look at has had the 'H441' recall done, an update that fixed a potential battery overheating issue that could lead to fires.

MERCEDES-BENZ B250e

SPECS	Sport Auto
Power	177bhp
0-60mph	7.6secs
Top Speed	99mph
Torque	340Nm
22kW 10-80%	3.5hrs
Energy	3.2 miles/kWh

▶ Here's one you might have forgotten existed. Before it dived headlong into electric cars with the EQ models, it launched the B250e in the UK in 2015, an all-electric version of the B-Class mini-MPV with a 28kWh battery pack, a 177bhp electric motor powering the front wheels (co-developed with Tesla), and few other telltale signs that it was powered by electricity.

In some ways, that's a very good thing. If you're not keen on the idea of 'car as computer' then the B250e's entirely conventional cabin, which even has regular dials and needles in the instrument cluster, will be welcome.

Its claimed 142 miles (make that around 100 in real-world driving) should still be enough for local use, especially if you knock the car into its 131bhp Economy or 87bhp Economy Plus modes to eke out a few more miles.

Today, between £7k-£11k gets a B250e, and while they're relatively scarce compared to LEAFs, Ioniqs and e-Golfs, there are usually a handful for sale at any one time. While the B250e was somewhat experimental for Mercedes, a stepping stone to more widespread EV adoption, it was still well-engineered.

Problems seem relatively few, though the earliest models can suffer coolant leaks, while a recall was issued over loss of drive in very early 2014-2015 cars. Owners report that parts are expensive – something it has in common with the regular B-Class – and third-party knowledge on them is thin on the ground, due to their rarity, which might make maintenance difficult further into the future. That said, its relatively straightforward nature may help it here, so don't be too put off.

Electric Drive

MINI ELECTRIC

SPECS	Cooper S hatchback
Power	184bhp
0-60mph	7.1secs
Top Speed	93mph
Torque	270Nm
50kW 0-80%	36mins
Energy	3.9-4.0 miles/kWh

▶ MINI first dabbled with electric power in 2010 with the two-seat, R56-based MINI E, enjoyed on lease only by 40 UK owners before being requisitioned by the company. You won't find any of those for sale, but the market is awash with its successor, based on the F56 platform, which arrived in 2020 and went off sale in 2024 when it was replaced by the latest car.

Like all EVs of the last few years, it's depreciated like milk in Death Valley. What was once a £30,000 car just a few years ago can now be picked up for under £10k for one that hasn't run into something, and with a real-world range of around 100 miles (140 miles officially), none have achieved particularly high miles so should still look and feel fairly fresh. All came in Cooper SE trim, though there were a handful of special editions over the years, such as the dark green Resolute with its gold stripes. Performance was on par with the petrol Cooper S – 0-62mph in the low seven-second range and 184bhp to the front wheels.

Like all MINIs, it's a laugh to chuck about, though you do feel the extra weight – it's carrying around 150kg more than the combustion car. Also like all MINIs, the cabin quality feels top-notch, and almost a shame that the limited range will confine it to short trips, since you'd happily drive it a lot further if it was easier to do so.

The car's new enough that problems don't seem to have materialised in any serious numbers and all cars will still be well inside their eight year/100,000-mile battery warranty should the pack expire any time soon. Instead, focus on any regular supermini foibles resulting from careless urban use.

NISSAN LEAF

SPECS	Tekna auto
Power	107bhp
0-60mph	11.1secs
Top Speed	89mph
Torque	254Nm
50kW 0-80%	30mins
Energy	2.9-3.3 miles/kWh

▶ The Nissan LEAF wasn't the first proper electric car effort from an established volume carmaker – the Mitsubishi i-MiEV slightly beat it to market – but it was perhaps the first that might realistically replace a family's main mode of transport, thanks to its relatively conventional Golf-sized body and class-typical performance, and a 107bhp motor powering the front wheels. Today, it's absurdly cheap, and perhaps the ideal starting point if you're wishing to dabble in the mechanical aspects of EVs. Early cars start at under £2000, while our £15,000 budget is enough to get you into a late second-generation (2017-on) model.

So it really depends on what you want. The second-gen LEAF is more usable as daily transport, with WLTP range of up to 170 miles from its 62kWh battery pack, while the early 24kWh cars (a 30kWh pack was offered from 2016) are bargain-basement and mostly urban-only transport, the original 109-mile NEDC range tapering off significantly with age. Even early cars were an impressive achievement though. To justify it as a serious venture Nissan went above and beyond with things like refinement and quality, which still pass muster today. The car is proving incredibly reliable too; battery degradation aside, the LEAF has no real major issues – although check for corrosion underneath.

The only other thing that hampers the LEAF for daily use is Nissan's adoption of the CHAdeMO cable for rapid charging, rather than the Type 2 fast charging and CCS standards widely used across the UK. That said, if you intend to use the LEAF primarily as an urban runaround rather than a road-tripper, home charging will be the order of the day anyway.

RENAULT ZOE

SPECS	ZE50 52kWh
Power	107bhp
0-60mph	11.4secs
Top Speed	84mph
Torque	225Nm
41kW 10-80%	1hr
Energy	2.6-5.7 miles/kWh

▶ Like the Nissan LEAF, the Renault Zoe was another early mainstream entrant into the electric car market, and benefitted from having very little competition in the electric supermini space – quickly becoming one of Europe's best-selling EVs. And as with the larger LEAF, it's among the cheapest EVs you can buy used, with prices for running cars starting well under £3000.

It stayed in production until 2024, and even the very latest cars dip under our £15,000 budget. Once again in common with the Nissan LEAF, this gives you plenty of choice depending on your circumstances: pick a late model with the 52kWh battery pack and 239-mile WLTP range (only just shy of the modern Renault 5 E-Tech) if you want an EV to hop into and go, or an early car with the 22kWh pack and 130 miles (when new) for the cheapest urban transport this side of a bicycle.

All are pleasant to drive and less deliberately futuristic than the LEAF – the early cabin uses light colours to good and airy effect, a Clio-style centre console, and a simple driver information display. You sit high, for good visibility if a less sporty feel than an equivalent Clio, and on the road the Zoe is similarly geared towards comfort over agility. 2019-on cars ramped up cabin quality as well as range.

As a supermini, the Zoe is susceptible to all the normal small-car ills – parking damage, mismatched tyres and the like, and minor electrical issues can crop up (once again, the 12-volt battery can be problematic). Early Zoes were often bought cheaply with a battery lease paid on top, and if the lease hasn't been bought out, you may still need to pay upwards of £49 a month (though it has the benefit of covering the battery for the lifetime of the car).

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SMART EQ FORTWO

SPECS	Edition 1 auto
Power	80bhp
0-60mph	11.2secs
Top Speed	81mph
Torque	160Nm
22kW 10-80%	40mins
Energy	3.8 miles/kWh

▶ Smart has abandoned tiny city cars in favour of churning out the same compact and mid-size SUVs as every other manufacturer – which makes you wonder what the 100,000-or-so people who used to buy Smart Fortwos each year are buying instead, with no tiny city car to replace it (no, the Citroën Ami doesn't count). That was the figure before Smart went all-electric in 2019, anyway, when the '453' generation Fortwo and Forfour, the cars developed in conjunction with Renault and the Twingo, ditched petrol power for electric power and EQ branding.

Both are of limited use outside of the city, with Smart quoting range of only 70 miles for both Fortwo and Forfour, but in town it's still difficult to think of a car better suited to narrow, crowded streets. Both have an impossibly tight turning circle, good visibility courtesy of a high driving position, and these 453 models ride a lot smoother than their predecessors too.

The EQ models arrived in 2018 and you'll find early cars with pretty modest miles for around £6000. Both got a rather angry-looking facelift in 2019, coinciding with the brand going full-EV, with these starting at more like £8000. Fortwo variants had a convertible option and both had Brabus trim levels, which look fancier but offer no more than the standard 80bhp.

Most should still be within Smart's eight-year, 62,000-mile battery warranty to cover the big stuff, and they seem reliable too – perhaps helped by most covering relatively few miles. As city cars, look for scuffs and scrapes (particularly to the intricate alloy wheels, and knocks can also affect the tracking), but otherwise the 453 has few common ailments.

TESLA MODEL S

SPECS	90D Dual Motor
Power	411bhp
0-60mph	4.2secs
Top Speed	155mph
Torque	658Nm
50kW 0-100%	2hrs
Energy	3.7-3.8 miles/kWh

▶ The best big-car bang per buck used to be something like a BMW 5-Series or Mercedes E-Class with a big diesel engine, but these days, it's arguably a Tesla Model S. For Tesla's first attempt at a serious production car entirely of its own design (i.e. not heavily Lotus-based like the Roadster) it was a seriously impressive, game-changing effort, and today they're available from little more than £10,000.

That sum gets you a car from the first few years of UK allocation after its introduction in 2013, typically in 70D form (a 70kWh battery for 275 miles of range, and dual motors for 324bhp combined). Pre-2017 cars are most easily identifiable by a more traditional (albeit blanked-off) front grille design; later models got a flatter front with a slim T-shaped grille.

Driving one is quite an experience even today, especially if you're not familiar with EVs. The interior is vast and spacious but somewhat austere, and visually defined by an enormous central touchscreen – though switchgear borrowed from Mercedes makes these cars in many ways easier to use than brand new Teslas. Performance and refinement are strong across the board.

That some owners have covered huge mileages in their Model S is reassuring both for the car's usability, and its reliability. An old Model S won't go quite as far on a charge as when it was new, but batteries also don't seem to be degrading too quickly over time. They're far from fault-free though: build quality varies hugely, minor electrical issues are common, and as a big and heavy car, it can be tough on suspension components. Some earlier cars still have free lifetime use of Tesla's Supercharger network though – so running costs can be very cheap indeed.

VW E-GOLF

SPECS	e-Golf Auto
Power	134bhp
0-60mph	9.3secs
Top Speed	93mph
Torque	290Nm
50kW 0-100%	1hr
Energy	4.0 miles/kWh

▶ The Mk7 Volkswagen Golf is seen as something of a high watermark for the nameplate. It looks good, drives well, and offered myriad variants – one of which was an all-electric model, called the e-Golf. And while it has the same limitations as other relatively early EV ventures, it's also just as good as any other Mk7 Golf.

The e-Golf launched in 2014, just two years after the Mk7 itself, with a 24kWh battery pack delivering 118 miles of NEDC range in ideal conditions. Come 2017, the battery expanded to nearly 36kWh of capacity, a full 50% bigger, and with it came a 190-mile NEDC range, reasonably competitive for a car of its size at the time. These later cars are quicker too, courtesy of a 134bhp electric motor, rather than the original's 114bhp.

It was, essentially, very Volkswagen in its approach: deeply sensible and practical, yet also a little more desirable than mainstream equivalents like the Nissan LEAF and Hyundai Ioniq. It remains appealing today, not least because you can get into one of the 36kWh models from around £8000, while the very best top out at £13,000.

The driving experience is… well, like a Mk7 Golf, just a bit quicker, quieter and smoother off the line. There's enough pep to get the holeshot at the traffic lights, neat and well-weighted steering, and a ride that doesn't fall apart on poor roads. The car itself shouldn't fall apart either: the e-Golf has had a handful of recalls (relating to lighting, locking, and wheel bearings), while charge port doors can lock shut and infotainment screens can be buggy, affecting some charging functions. The drivetrain and battery pack however have proven robust. 'If only everything in life…' as the old ads used to go.

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CITROËN DISPATCH

The Citroën Dispatch forms the basis of what feels like half the vans on the market. Launched in 2016, it isn't just shared with fellow Stellantis partners Peugeot (as the Expert), Fiat (the Scudo, since 2022) and from 2019-on, Opel and Vauxhall as the Vivaro, but also Toyota, whose Proace is a Dispatch under the skin. That's before you even get to all the passenger-van variants, too.

It's the classic Ford Transit rival, or Transit Custom as it is today – a medium panel van offered in a series of body and wheelbase lengths, a six-seat crew van option, a one to 1.4-tonne payload depending on the engine and variant, and room for a couple of Euro pallets even in the 'XS' short-wheelbase version. Length-wise you're looking at around 4.6 metres at its shortest to 5.3 metres for XL models.

Then there's the engine range. Citroën hasn't yet adopted petrol or hybrid tech in the Dispatch, so from 2016-on the current model has had a choice of a Ford-sourced 1.6-litre turbodiesel, a later (2019-on) 1.5-litre turbodiesel, or a PSA 2.0-litre turbodiesel, with different power outputs depending on the year. The smaller diesels are manual-only, but the 2.0-litre also has an eight-speed automatic option. All meet Euro 6 emissions standards, so all should dodge the ultra-low emission zone fees in London and some other UK cities. There is one other way of doing so however, since Citroën has also offered an all-electric e-Dispatch since 2020, with a 134bhp motor, 50 and 75kWh battery options, and a range of up to 148 and 211 miles respectively.

That's a lot to take in, but pricing is a little more straightforward. Five grand is a suitable starting point for a Dispatch that hasn't been clattered into every delivery gate and height restriction in the northern hemisphere, while our upper budget will net you a van that's just two or three years old, even including VAT. Electric versions are much less common and start at £14k and up (also including VAT), though this means they're still within budget, and they're new enough that the batteries should have plenty of life left in them.

SPECS
Dispatch 2016-on

Payloads	
XS	1000kg
M	1200kg
XL	1400kg
Max load length	
XS	2160mm
M	2510mm
XL	2860mm
Max load height	
All models	1397mm
Max load width	
All models	1628mm

The Dispatch doesn't just share its bones with the other vans mentioned earlier, but based on PSA's EMP2 platform, it shares some similarities with many of the group's regular cars too, so ride, handling, and refinement are all strong points of Citroën's van, as are comfortable seats and an upright but fairly car-like dashboard. Visibility isn't as expansive as some vans – that distinctive squinty styling results in a relatively short windscreen height. Touches like a load-through bulkhead are handy though.

There have been a handful of recalls over the years (suspension and steering recalls among them), but the basic mechanicals are reliable – providing the van has been serviced well and avoided abuse. Turbo issues aren't unknown and excessive urban driving can result in the usual EGR and DPF issues – but the van's ubiquity means parts aren't difficult to come by.

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FORD TRANSIT CUSTOM

▶ Ford called it the 'Backbone of Britain' in an old marketing campaign, to the public it's the default 'white van man' van, and its owners make it not just one of Britain's most popular vans, but one of its most popular vehicles full stop – in 2024 Ford delivered nearly 47,000 Transit Customs, behind only the 48,000-strong Ford Puma and the Kia Sportage at just over 47k in the sales charts.

You can still get a larger van badged simply Transit, aimed at the likes of the Mercedes Sprinter and Renault Master, but since 2012 the Transit Custom nameplate has referred to the big-selling medium-sized model that can trace its history back to 1965. It slots in below the Transit, and above the Volkswagen-based Transit Connect, and Fiesta-based Transit Courier.

From 2023 the Transit Custom has also been VW-based, closely related to the Transporter, but our pick here is the 2012-on version sold in two lengths and roof heights and a wide range of engines, encompassing regular turbocharged diesel units, but also a petrol plug-in hybrid (from 2019 onwards) and a diesel mild-hybrid. Naturally, there were several power outputs too, from 99bhp in the least-powerful 2.2 diesels from 2012-2016, to 130bhp in the 2.0 EcoBlue-badged diesel mild-hybrid sold after 2019, and 182bhp in the most powerful 2.0-litre diesels. While the larger Transit, and pre-2012 Transits were available with rear-wheel-drive (and four-wheel-drive), the Transit Custom is front-drive only, in common with most rivals. Even so, there were potentially hundreds of combinations when new, so hunting down your ideal spec, despite the huge choice on the market, may not be so easy.

Pricing starts at £3000 and up, though such vans will have been "ridden hard and put away wet". Vans for a couple of grand more immediately start to look a lot tidier and with careful maintenance can be pressed into regular use without too many ailments (or make a good basis for affordable camper conversions). Around £4k is where 2017-on 2.0-litre diesel versions and 2018-on facelift models start, though again you'll want to add a little more for a van that hasn't been to, and then crashed into, the moon. Hybrids are rarer, and begin around £10,000.

Much like the brand's cars, the Transit Custom is among the better vans to drive, with surprisingly sharp handling, but it's competitive in terms of utility too, with up to a 1.5-tonne payload even in the shortest, lowest-roof model, while the Focus-like dash is hard-wearing.

Reliability is harder to judge: the van's huge popularity means an equally huge variance in how vans are treated, and predictably those who look after them and undertake regular servicing seem to have few issues in hundreds of thousands of miles, while abused vans die quickly. That said, 2012-2016 2.2 diesels have a better reputation than the 2.0 EcoBlue that replaced it, in part due to the latter's wet timing belt design.

SPECS

Transit 2012-2023

Payloads	700kg-1500kg
Max load length	
SWB low roof	2554mm
SWB high roof	2554mm
LWB low roof	2921mm
LWB high roof	2921mm
Max load height	
SWB low roof	1406mm
SWB high roof	1778mm
LWB low roof	1406mm
LWB high roof	1778mm
Max load width	
All models	1775mm

MERCEDES-BENZ SPRINTER

▶ The Mercedes-Benz Sprinter is the king of the panel vans. Offered in a truly bewildering array of variants once you factor in chassis cab versions (we'll be mostly ignoring the Luton vans, dropsides, tippers, and bus conversions here, but rest assured they exist) it has a reputation for longevity, mechanically at least, as well as safety, driveability and technology. Throw in the three-pointed star on the grille, which seems to have just as much prestige in the commercial vehicle sector as it does for passenger cars, and the Sprinter is the complete package.

This second-generation version spanned 2006 until 2019. Like most vans that's a long lifecycle, but even as it was being replaced, the Sprinter remained competitive, aided by updates in 2013 including fresher styling and an updated engine range, plus useful driver-assistance technology such as crosswind stabilisation – a world first – and lane departure warning. Models after 2013 can almost be considered a new generation, though they're still heavily based on the 2006 van.

Diesel power is central to the range, while a 1.8-litre supercharged natural-gas powered engine was briefly offered – though good luck finding one today. The 2.1-litre four-cylinder and 3.0-litre V6 diesels have a great reputation. They're usefully muscular – even the basic 93bhp engine makes a grunty 184lb ft of torque, while the V6 offered 187bhp and 325lb ft – and in most cases power the rear wheels, though four-wheel-drive was available. What they lack in economy compared to some contemporary rivals, they make up for in longevity. The OM651 four-cylinder in particular is long-lasting – it was used in the brand's cars too and if well-maintained will keep motoring deep into six-figure mileage.

That's just as well given the Sprinter has become a favourite of the camping and 'van life' set, and many lead long second lives bouncing between campsites and beauty spots. The Sprinter's vast load area (up to 4.7 metres, longer than most entire cars) leaves plenty of space for beds, sinks, cooking equipment and even chemical loos, while the high-set seating position and huge windscreen make for an appealing view out on the road. It doesn't matter so much that the van's infotainment became outdated either, as the dash hosts a handy double-DIN slot into which you can fit more or less any aftermarket system.

Sprinters definitely drive best with a load, like a lot of larger vans, but all drive generally well, even if they're far from the more car-like experience you get with models a size or two down. Manual gearshifts are easy to use and the automatic (five-speed early on, seven-speed later) means even driving something this big can be a real doddle.

Like the other vans here, long-term durability hinges very much on maintenance. 2006-on Sprinters don't rust as much as older models, but corrosion can still be a problem if the van has seen heavy year-round use; given the number of vans out there, you're probably better off finding a less rusty one than trying to fix a rotten Sprinter.

SPECS

	Sprinter 2013-2022
Payloads	
3.5-tonne	1408kg
5.0-tonne	2321kg
Max load length	
Short stand roof	2700mm
Short high roof	2700mm
Med stand roof	3365mm
Med high roof	3365mm
Long high roof	4400mm
Long s/high roof	4400mm
Ex-long high roof	4800mm
Ex-long s/high roof	4800mm
Max load height	
Short stand roof	1650mm
Short high roof	1940mm
Med stand roof	1650mm
Med high roof	1940mm
Long high roof	1940mm
Long s/high roof	2140mm
Ex-long high roof	1940mm
Ex-long s/high roof	2140mm
Max load width	
All models	1780mm

VAUXHALL VIVARO

▶ If you want to know what the 2019-on Vauxhall Vivaro is like, simply flip back a few pages and read about the Citroën Dispatch, because since General Motors' ailing European brands Vauxhall and Opel were absorbed into the Stellantis group alongside Peugeot, Citroën and others, the Vivaro suddenly became a Citroën.

Prior to this the Vivaro was also French – the company designing it was just Renault instead. It was sold alongside the Renault Trafic for two generations, with the second-gen model we're covering here on sale between 2014 and 2018. Despite this relatively short run by van standards, the Vivaro's popularity means it was, and still is, a common sight on the roads, and it's possible to find these vans anywhere upwards of £3000 for one in relatively tidy, relatively functioning condition.

At the other end of the scale are the best pre-Stellantis vans, either with low miles, high spec, or in minibus and camper forms – the Vivaro making quite a good basis for a camper, as it's usually a little more affordable than VW Transporter, Mercedes Vito, or even Ford Transit-based models. It's not like you're getting a worse van either, as the Vivaro was rated highly by the press when new, on account of its fine ride and handling, smart cabin, and frugal diesel engines.

It was also built in Britain, something that used to be a point of pride for the Transit until production of the Transit Custom moved to Turkey. French bones or not, it's nice knowing the Vivaro was made metaphorically just down the road (high-roof versions aside, which were made in France), and it no doubt contributed to its popularity. While some may still sniff at the mechanicals (the 1.6 and 2.0-litre diesel engines are joint Renault and Nissan – the Primastar is another van on this platform), Renault's van history stretches back decades with the Trafic and Vivaro – and the vans are pretty good mechanically. There are notably few angry forum threads about either engine which is typically a good sign, though timing chains on the 2.0-litre need attention at around 100,000 miles, while the design of the scuttle can funnel water towards the injectors, also causing problems.

SPECS Vivaro 2014-2018

Payloads	1000kg-1300kg
Max load length	
L1H1	2537mm
L1H2	2537mm
L2H1	2937mm
L2H2	2937mm
Max load height	
L1H1	1387mm
L1H2	1898mm
L2H1	1387mm
L2H2	1898mm
Max load width	
All models	1662mm

The smaller 1.6 (which also uses a timing chain) is proving reliable too for the most part, and while the engine seems tiny for a relatively chunky van, some models featured twin turbochargers (marketed by Vauxhall as BiTurbo). At launch, it was one of the most efficient vans in its class too, claiming up to 47mpg.

Practicality is on par with similarly-sized vans, with payloads from one tonne to around 1.3 tonnes, and all is well up front too – the Vivaro's cabin is robust and nicely laid-out, with the now-popular dash-mounted gearshift, clear and simple instruments, and a driving position that, while usefully high for visibility, is more car-like in its comfort levels – again, it's certainly not something to be put off by if you're sceptical of the Vivaro's French origins.

VOLKSWAGEN TRANSPORTER

▶ What the Mercedes Sprinter is in the realm of big vans, the Volkswagen Transporter is for medium-sized panel vans: simply the most desirable model around. VW can point you towards the heritage of its Transporter name and its lineup of panel vans in general, which stretches all the way back to the Volkswagen Type 2 of the late 1940s, and while the electric ID Buzz is now the vehicle VW uses to pull on those heartstrings, it's the Transporter that's the real hard-working tribute to the original.

The very latest Transporter is known as the T7, representing the model's seventh significant iteration. But the Transporter's popularity means you have to look to an older model to slip below our £15,000 budget – and things are complicated somewhat by the fact that tidy examples of even earlier vans are mixed in amongst the later ones.

For simplicity then we'll concentrate on the T5 generation, sold from 2003 until 2016. It's very easy indeed to max out our £15k limit on a T5, especially a post-2009 facelift model, and in fact a nice camper version will go for significantly more than that. But if you want a straight panel van, either for business purposes or converting into something else, then T5s that aren't riddled with rot begin at around £3k and up.

Most desirable of the pre-facelift vans are those fitted with the five-cylinder 2.5 TDI engine, which delivered whopping performance in its day (its 295lb ft of torque was only later matched by the twin-turbo 2.0 BiTDI) and has no trouble shifting the T5's bulk now. The ubiquity of the four-cylinder diesels though – the 1.9 TDI PD until 2009, and the 2.0 TDI after – and each unit's near-unburstable nature makes them a natural choice for most uses. There are plenty of specialists willing to extract more performance from them if desired, too.

A nice T5 remains a great van to drive, too. Equipment, technology, refinement and performance of modern vans have all by now eclipsed the T5, but if you're used to passenger cars of the early 2000s then a Transporter really won't feel too far removed. Manual gearboxes are slick to use, and of course there were auto options too – a six-speed auto, or a seven-speed DSG later on. The cabin is comfortable and well-built, shrugging off wear even in high-mileage vans, seat bolster wear aside.

Like our other vans, ultimate longevity really depends on the Transporter's past life and how diligent previous owners were with maintenance, but a well looked-after T5 should last for years and won't baulk at huge mileage. 1.9 TDIs need cambelt changes at 60,000 miles. Engine management lights aren't unusual, but rarely anything serious – typically a sensor, or a faulty EGR valve, though failing coil packs can also trip the light. In terms of recurring issues, failing dual-mass flywheels, and water pumps on earlier 1.9 and 2.5 TDI units can crop up – as can rust, these days.

SPECS

Transporter 2010-2015

Payloads	729kg-1333kg
Max load length	
SWB	2570mm
LWB	2970mm
Max load height	
Standard roof	1410mm
Medium roof	1626mm
High roof	1940mm
Max load width	
All models	1692mm

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Help!

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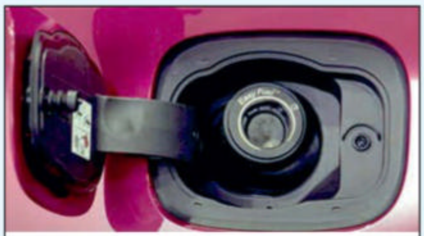
FORD FOCUS

Petrol filling problem

Q I am hoping you can help me discover what can inhibit the insertion of a petrol station pump into the filler nozzle on my 2020 Ford Focus estate. When I last went to fill with petrol, the nozzle did not want to go to the full depth into the filler and it was as though the inner flap was locked. I had to double check that I was using the correct pump and that this was the petrol and not the larger diesel nozzle.

A member of the fuel station staff did attempt to insert the pump for me but had the same result. I am now concerned and was hoping you may be able to tell me what needs to be done.

Brian Coutts



The Ford easy fill petrol filler – easy fill when it is working correctly.

A The filling system works using a small black plastic blanking plate at the neck of the filler – looking into the filler you should see this blanking plate. When you put the filler nozzle into the neck, this small plastic blank should operate a more secure filler cap system which sits below it.

When looking down the neck of the filler if you cannot see this black plastic blank plate, but can see a more metallic type of mechanism, this is a sign that the black plastic plate has become dislodged and is jamming the system.

The remedy will involve the filler neck being removed and then either will need a repair of the mechanism by removing the blanking plate and freeing the mechanism, or it may need a new complete mechanism. Unfortunately, this is a situation that can occur even after limited use.

It must also be noted that care should be taken trying to move the mechanism using a screwdriver which is sometimes advised. While this can work it must be ensured that no metallic parts of the mechanism drop into the tank.

I would love to be able to give you an easy fix for this problem, but unfortunately this will most probably require the dismantling of the filler neck to resolve the situation.

FORD FOCUS

Intermittent problems

Q My lady's 2008 Ford Focus 1.8 TDCi which just reached 170k miles, has intermittent issue with starting, that so far only occurred twice. Once four months ago and now, at the end of this month. Four months ago, she was attending a wedding and she was pushed-started by people attending, but now it happened at home, so she just took my car to work. It does come handy having three cars in the house.

When I had a go at starting it, I pressed the accelerator gently and after long cranking it fired into life. Some fault codes are stored in the ECU, with the most relevant I think being P0087, which I retrieved using ForScan app (dedicated to Ford vehicles). There is no MIL present, and cars drives as normal once started.

The other codes retrieved were P0113 and P0101. The car had fuel filter changed a year ago and since then, it only covered about 10k miles, and there was nothing worrying in the filter housing.

Four months ago, using ForScan I compared Mandy's and my Focuses' fuel rail pressures expecting hers to show perhaps lower values – mine is a year younger model with only 100k miles with no issues. They were very much similar with around 5000 value at idle, and double that at 2500rpm.

I would appreciate your advice on what might be causing this non-starting issue.

Bartosz

A As this is an intermittent fault, this does make diagnosis a little more difficult. The code that you have mentioned P0087 does indicate that the fuel rail/system pressure was detected as being too low. This may be due to a fault in the fuel pressure solenoid, which is incorporated into the high-pressure pump. This part is available separately and can be replaced if needed.

The other codes indicate P0113 Intake air temperature (IAT) sensor - high input and P0101: Mass air flow (MAF) sensor/volume air flow (VAF) sensor - range/performance problem. There are a couple of possible scenarios that could cause the non-start situation. The first is as said that the fuel pressure solenoid or the fuel control valve in the high-pressure pump failed at the time, but subsequent operation has allowed it to continue.

The other possible scenario is that the EGR valve stuck causing the P0101 code due to the imbalance of air in the system. It is also possible that the MAF itself was at the source of the problem, but this would be less likely.

Although the readings you got from the fuel pressure sensor did appear to be good, as this is an intermittent fault this may only show a reduction in the pressure when the fault occurs.

If you can read the faults and the live pressure when this non-start scenario occurs this should give a much better indication of the source of the problem.

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FORD RANGER

Auto gearbox fault

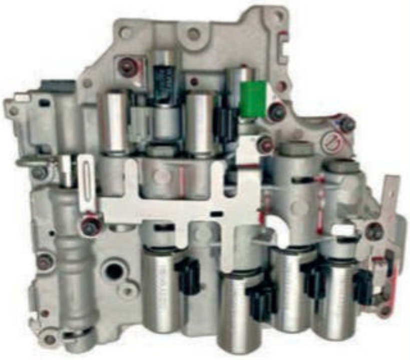
Q I am having issues with my auto gearbox. The vehicle is a 2016 Ford Ranger 3.2 TDCi and has covered 109,000 miles. It is sticking in first gear when cold – it won't respond at all, even in manual mode, changing revs, it will rev very high and not change up to second. The only way to get it to sort itself out is to stop and put it in neutral then it usually works fine for the rest of the drive. It doesn't do this every time probably once a week. Another possibly related issue with the 'box is that it can be quite rough changing when cold, and also I sometimes need to press hard on the brake at junctions to overcome the creep forward.

I tow about 2 tonnes with the truck. It does not seem to slip and runs and changes fine generally once it's warm after five to ten minutes.

What I have done so far – there are no codes for the gearbox, I do have an EGR temp sensor fault and glow plug 5 is open circuit, which is throwing the spanner light occasionally for 10 seconds at a time when towing. No faults on the autobox though. I have done a fluid and filter change on the 'box (not a flush). It took about 6 litres of new fluid. The old fluid was brown/grey and there were some tiny metal fragments on the magnet but nothing excessive. It looked pretty clean inside considering this was likely its first gearbox service at 107,000 miles.

Could you help with some diagnosis or ideas of what I could do, or what my options might be for repair? Many thanks.

Joe Green



An automatic transmission valve block similar to that fitted in the reader's Ford Ranger.

A You mention that no codes are present in the transmission, and I am presuming that you do have a diagnostic scanner that would show transmission codes, as these would not be visible with an EOBD scanner. There is a warning light that may be triggered if a fault of an electrical nature was detected in the powertrain, but this is not always the case.

The brownish fluid does indicate that wear may have taken place in the transmission, and this coupled with the signs of metal fragments may be standard wear and tear as opposed to anything more concerning.

I do have the drain and fill capacity of the transmission as 9 litres, and so I would first ensure that the level is correct and ensure that the fluid has not discoloured since the gearbox was refilled. I would also ensure the correct oil is used and this should be Mercon LV conforming to WSS-M2C938-A – this is quite important.

If this is the case, then I would check the connections to the transmission control module which are located in the passenger area to the front of the A-pillar at dash level. Once these points have been eliminated then the most likely scenario is that the problem is either in the valve block or one of the eight solenoids attached to the valve block that regulates the operation of the gearbox.

It is likely that one of the valves in the valve block is no longer sealing and holding pressure but testing this is only possible with dedicated equipment.

FORD ESCORT

Clutch adjustment

Q My Ford Escort Mk1 handbook says there should be 1.5-2cm (approx.) clutch adjustment free play. But I read online – quote "a release bearing fork and bearing which are in permanent contact with the release fingers on the pressure plate, there should therefore never be any free play at the release fork."

This seems to be conflicting information. Can you give me advice about this?

A R McCalla

A The release bearing and fork do need to be in constant contact to prevent unwanted vibration and excess movement, but this is a light contact, and this will normally still allow a the small amount of free play at the pedal.

The clutch system on your Escort uses a hydraulic slave cylinder which is enclosed within the bellhousing and has no clutch release fork. The concentric slave cylinder which combines the clutch slave cylinder, and the release bearing needs no adjustment and is fully self-adjusting, adjustment is not possible, but the Ford manual still gives the optimum pedal travel and this is for inspection purposes.

No adjustment is possible, but the specification is given as alteration in this travel may alert a problem with the clutch mechanism.

FORD PUMA

Low mileage concern

Q I currently drive a Ford B-MAX 1.0 EcoBoost with the Stop-Start system but as I only do 3000 miles per year, this seldom works as the battery does not get enough charge. I charge it up twice a year. I am considering buying a new Ford Puma which comes with a mild-hybrid system. Will this be an even bigger problem keeping both batteries sufficiently charged due to my low mileage, especially in the winter when some weeks the car may only do one 10-mile run?

Also am I right in thinking the 1.0 EcoBoost is now fitted with a timing chain to overcome the problems with the belt-in-oil system?

Douglas McKenzie

A Starting with your last question first, yes, the 1.0 EcoBoost engine in the Puma built since 2020 does now use a timing chain so this will negate the former problems with the BIO system.

The hybrid system on the Puma is what is known as a soft hybrid and uses a 48-volt battery, with an electric motor, used to provide additional support to the petrol engine when needed. The separate 48-volt battery pack that powers the electric motor is recharged while you drive – and as this is the system used for the Stop-Start operation, you should find that this will be less of a problem than it is on your present B-MAX.

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FORD KA

Electrical issues

Q I have a 62-plate Ka 1242cc petrol with the following issues, with only 46,000 miles. I have the Stop-Start light (normal brightness) and the passenger airbag (dimly) lit intermittently and sometimes the MIL as well as the exclamation amber light. When the ignition is off, in the dark a couple of the lights including the battery light and the central locking light are sometimes very dimly lit for a while after locking. The car battery does not go flat if left.

Sometimes the car loses all throttle response (idles only) and only resumes to normal operation with a restart. The remote central locking sometimes does not operate with the fob although it always operates with the key, and although this is of little importance really, I mention in case connected to the warning lights. I do not have other lights flashing with indicators nor do I have fluctuating needles as can be the case with a faulty cluster.

The MIL is not always on and sometimes there are no lamps lit at all. When the car goes through the check prior to starting the passenger's airbag light is always at full brightness but dims on start when the Start-Stop remains on, although sometimes all is normal. Drivers' airbag shows no fault.

If all is normal, Stop-Start will function as it should, but to note is that if the Stop-Start button is operated at this time it will illuminate but the passenger's airbag also illuminates dimly, the same as it does when the fault presents.

I think two separate issues here but ideas welcome. Earth? TPS? ECU?

Also on my Fiat 500 prior to this, the Ka had a new clutch fitted, and as it was bought at auction, I cannot get any further info. It also drove 30 miles from the auction with no lamps lit! Many thanks in advance.

Jim Laing

A I would suspect that all the problems are related and will be possible due to a poor earth issue, or a dash pod problem. The dash pod on the Ford range is known to give problems and the issues you have listed could all be caused by a dash pod problem.

As the Ka has recently had a clutch, I would first check the earth connections and remove these and clean them to ensure that although they may be in place and tight, that the connecting faces are also clean.

If after checking the earth connections to the body and engine, then I would consider sending the dash pod for testing, there are a number of companies who can carry this out now including actronics.co.uk and ecutesting.com

This I suspect is the most likely source of the issue.

FORD KUGA

Parking brake

Q I was doing a rear brake pad change on a 2018 Ford Kuga 1.5 EcoBoost with electronic park brake. I put the car into service mode but when resetting got the amber park light on permanently, and next to it a red flashing park warning light. I checked fault codes and this came up as B111.54.21 electric park brake enabled.

The park brake was off, so I tried clearing the fault but it won't clear. The park brake works fine, I have checked all my work was OK but can find no problems. Any ideas where to start?

I've checked the brake fluid level and all fine, so not sure if fault is in one of the calipers. Any ideas would be good. Many thanks.

Mark Deane

A This code is referring to a calibration error and unless new components have been fitted can normally be cleared by simply applying and releasing the parking brake using diagnostic equipment. As this code cannot be cleared it may require dedicated diagnostic equipment to rectify the issue, and this still may be as simple as applying and releasing the brake using the diagnostic equipment, but there are a couple of things that I would try first. You mention that the car was put into service mode, and I would carry this out again using the following steps:

- **Switch the ignition on, then depress and hold the accelerator pedal down. Press and hold the EPB switch and whilst holding, switch off the ignition and then on again within 5 seconds.**
- **Wait until the EPB malfunction warning lamp illuminates and the message "Maintenance Mode" is displayed in the multifunction display, then switch off the ignition and release the accelerator pedal, then release the EPB switch.**

Then deactivate the service mode as follows:

- **Switch the ignition on, press and hold down the accelerator pedal. Pull and hold the EPB switch. Switch the ignition off and then on again within 5 seconds. Continue to hold the accelerator pedal depressed and EPB switch pulled.**
- **EPB will be heard to operate during automatic recalibration procedure. Wait for procedure to be completed then release the accelerator pedal. Then release the EPB switch and switch the ignition off.**
- **If the code is still present, I would then try disconnecting the battery for around five minutes, and then repeating the complete process again. If the problem remains, then it will require the dedicated diagnostic equipment to remedy the issue.**

FORD FIESTA

Rear brakes

Q It's rear brake service time on my 2008 Mk6 Ford Fiesta and I wonder if you can settle a clash of opinions, please. To remove the rear drum, one opinion is to remove the hub nut, the other opinion is to unbolt the hub complete with drum. Which do you think is the best way to go? Many thanks.

Dave Bennet

A This is a debate I have seen many times, and my own personal method is always to remove the centre hub nut and then remove the drum and bearing, replacing the securing nut when reassembling and torquing the centre nut to 235Nm.

I did check the Ford manual to confirm the advice and the method that they give, and this is to undo the four nuts at the rear and remove the complete hub flange and brake drum.

The reason for this method is that, once the flange is removed, the access to the brake shoes is much easier and the brake shoes can be removed and refitted with ease.

The downside of using this method, in my mind, is that removing the drum and the flange together can be a little cumbersome. It is also possible that the rear nuts securing the hub flange may be slightly difficult to access and the ABS speed sensor needs to be removed – if this is corroded, this could lead to the sensor breaking and so disturbing this may cause further problems. The advantages are of course that neither the centre nut or bearing need to be disturbed, and providing the brake drum is in good condition, then this should in theory be a quicker method of completing the whole job.

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JAGUAR XE

Steering concern

Q I am wondering if you might be able to give me some advice regarding another car – this time a Jaguar XE (belonging to my daughter's partner) which is causing a few headaches. The car is the 2017 X760 180bhp 2.0 diesel RWD model. The car was throwing up a couple of engine codes which I had intended to look at when I had time, but unfortunately in heavy rain, the car was driven through a deep puddle at which the power assistance on the steering ceased. The steering became very heavy, and the dash threw up a message regarding the power steering assistance being reduced. Looking online, it is suggested that this may be the result of water leaking into the PAS electronic components and that a steering rack replacement may be required.

We are now trying to decide whether the car is repairable (at reasonable cost – ideally by myself) or should be sold for scrap/parts. The local scrapyard has offered just £1500 for the car running or £750 if non-runner (it's currently not running only because the battery is old and flat). I feel this offer is very poor and wonder if the PAS is a job that I may be able to tackle. I'd be very grateful for your views regarding the following queries.

Is the steering rack on this model likely to need replacement just because the car was driven through deep water or are there other possible fault areas which might be considered first?

If the steering rack electronics have been affected, is it possible to carry out any checks or repairs on the electric components without the need of removing the whole rack?

Do you know of any companies that can repair steering rack electronics at reasonable cost or is a replacement new or second-hand unit required? Ideally in or around the North East – Durham/Darlington/Newcastle.

If we do need to replace the steering rack, is this a task that a reasonable competent and equipped DIYer may be able to tackle or are specialist tools required for the job? Any advice would be much appreciated.

John Bentley

The power steering rack on the Jaguar with the attached motor.

A The power steering control module is located on the power steering rack, and this could well be affected by the immersion in water. The position of the rack does expose it to problems from water ingress and this is quite a common problem across a number of Jaguars with the same set up. The rack can be rebuilt and the companies I have found who can do this charge just under £900 for the service. The other alternative would be to purchase a used rack, and these are between £400-£600. The price of the steering rack from Jaguar is considerably higher.

Whilst some factors do show that they can supply a replacement rack for the same £400-£600 price tag, the ones I checked are all out of stock at this time. I believe this is due to the common occurrence of the problem.

The value of the car in running order is anywhere between £4300-£9000 depending on condition and so this does suggest that the repaired vehicle would be worth considerably more than the £1500 offered by the scrapyard.

The job time for replacing the steering rack is 1.8 hours and the job involves disconnecting the rack, driveshafts, shock absorbers and dropping the subframe. The tracking will also need setting after the replacement, but this is a job that could be done by a confident DIYer, providing the tools required were available to support the vehicle and the subframe when dropping.

If you are going to send the rack away for the repair, you should also ensure that the body of the rack and the motor are complete as the repair can only be carried out with a fully functioning rack body. You should also ensure that the vehicle can be left safely whilst waiting for the rack to return.

JAGUAR S-TYPE

Electric window problem

Q You recently helped me with a problem with my wife's VW Passat and I've now got one with my 2002 Jaguar S-TYPE. The driver's side electric window stopped going down suddenly. I tried a replacement switch on the door panel to no avail and then a replacement regulator and motor with still no luck. The motor will go up when the button is pushed but nothing if you push the button in the down position. I'm now wondering if it's a random wire that's broken or something more in depth.

Any help would be gratefully received, many thanks.

Russell Wilton

A Having already replaced the window motor and the switch, this does eliminate these as possible reasons for the situation.

With this in mind the source of the problem may be due to a fault in the multifunction control module, which is attached to driver's door function control module, this controls the central locking, door mirrors, electric seats and electric windows.

However, as the problem is only in the lowering of the window, then it may be a wiring fault and the most likely area that this would be in the short loom between the driver's door and the body.

It would also be worth checking the multiplug onto the control module in the driver's door, I do suspect that with the work already carried out, that one of these areas will be the source of the fault.

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VAUXHALL MERIVA

Charging problem

Q I am hoping you can help solve a problem I'm having with my 2011 Vauxhall Meriva. I had a new alternator fitted and a new battery because the alternator failed, and the battery run flat. My garage said that the battery was getting old and advised that fitting a new one would be a good option.

Now intermittently the power steering light and battery light come on with a loss of power steering. Also, I found that when turning the ignition on but not starting the engine, if I then move the windows up and down the fault happens. If I then switch the ignition off and leave it for a bit when I come back and start the engine the problem has gone.

The problem never happens when driving, only intermittently when starting. It's like its losing power before start-up that's throws the code and lights on.

My mechanic has tried three different alternators and has checked the wirings from the alternator to the ECU and all the earth cables. The error codes in the system (P0621 & P0620) can be cleared when the engine is running, but if you try and clear them with ignition on and engine off, they just come straight back

Have you any suggestions? I have been reading *Car Mechanics* for over twenty years and this is the first time I have needed to ask a question.

Charles Davis

A Having replaced three alternators in an effort to remedy the problem I would hope that the alternator as a source of the problem can be eliminated. The codes are indicating a problem in the alternator warning light circuit, P0621 is indicating Alternator warning lamp - circuit malfunction and P0620 is indicating an alternator, control - circuit malfunction.

As both codes do refer to the connection of the alternator and it would appear that this fault was not present before the replacement of the alternator, I would strongly suggest that the wiring between the alternator and the engine control module is rechecked. Carefully checking the internal area of the connecting plug for any fracture in the wire.

However, the extra symptom you have which causes the fault to occur without the engine running when operating the electric windows could also indicate that either a main earth connection or the body control module is at fault.

It should also be considered that at the point of failure, the old alternator had a moment where it spiked in voltage, and this may have cause internal damage to either the engine control module, or the body control module.

It can be difficult to comment when it is said that the wiring and earth connections have been checked, but I would ensure that these checks were done with a suitable meter that did display any small amount of resistance in the circuits. If this is the case then I would send the ECU off to be tested to ensure that the problem is not within the unit after damage from a voltage spike.

VAUXHALL ASTRA

Overheating

Q I have recently had issues with my 2013 Vauxhall Astra 2.0 which broke down. My car overheated and left me at the side of the motorway – it has happened twice more since then (I've attached screenshots from the RAC's diagnostics machine each time this has happened). I've taken it to a garage who has had all the parts checked. I've replaced a temperature sensor, DPF sensor and all four glow plugs. During the diagnostics testing from RAC, they mention it could be a software issue and recommending getting the computer sorted/updated.

I contacted a local guy who does this for his job, He came along and updated the computer. But again, it broke down – all three times overheating (130°C). I am lost with what it could possibly be. On the third breakdown I have had the intercooler pipe checked by the mechanic and he said there is no issues with it.

Any recommendations please?

Kyle Nicholson

A Looking at the reports of the three breakdowns that you have kindly sent me, I can see that the same fault codes have appeared on each failure – these are P2428, P2101, along with codes P0671, P0672, P0674, P247A and P242D making an appearance.

Neither of the codes which were retrieved on all occasions P2428 indicating Exhaust Gas Temperature (EGT), bank 1 - temperature too high and code P2021 which indicates Intake manifold air control actuator position sensor/switch, bank 2 - circuit low, are pointing to an overheating situation. I can see from the RAC report that the engine coolant was checked, and this was found to be OK.

The reference to the high exhaust gas temperature can be for several reasons, but the first check would be to ensure that the wiring between the sensors and the engine loom are in a good condition.

I am making the presumption that the codes after the repair work had all been cleared and that at the time of the breakdown they had then returned.

The codes P0671, P0672 and P0674 are all indicating a glow plug circuit malfunction and this would not necessarily be the glow plugs, but possibly a wiring fault.

Having had the ECU software updated, this can hopefully be discounted as the source of the problem. The temperature reading of 130 degrees, would be the area to investigate. It should be ascertained if the engine temperature was actually getting this high or if this is a result of a fault in the wiring/ECU that is indicating this temperature. Was the cooling fan on when the vehicle was stopped?

The two codes that were also read P247A and P242D are indicating an exhaust gas temperature sensor fault, the first showing it is out of range and the second showing a high circuit, so again these codes may be pointing towards a wiring or loom problem. The engine communication does use CAN-bus wiring and this is more sensitive to resistance, and a good check of the wiring is advised.

The other possible scenario is that the DPF is restricted, and the regeneration process is causing the overheating and the returning codes.

This would though normally return a code of P2463 indicating a restriction or P242F, neither of which are present in the RAC reports.

In conclusion I would suspect that this is a wiring fault, but I would check the exhaust system pressure at the manifold to ensure that the DPF or even possibly the later section of the exhaust system is not restricting the exhaust flow which can then raise the temperature. For this I would recommend using an exhaust back pressure gauge to ensure that the system is flowing smoothly, a reading of below 3psi at around 2000rpm would be desirable.

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JEEP GRAND CHEROKEE

2 or 4 tyres?

Q My 2002 Grand Cherokee Overland, fitted with Quadra-Drive, is due two tyres. The garage has advised that due to permanent four-wheel-drive I should have all four replaced as a matching set. Otherwise, this would upset the suspension, increased tyre and suspension wear and also generate ABS faults. Are they right, or just trying to fleece me. Never been advised this in over ten years of ownership.

Gareth Baker

A In a perfect world then fitting four tyres would be the ideal option, but this is not a perfect world and the advice of discarding two good tyres Is not advice I would like to give. The Quadra-Drive system has a limited slip diff, and I suspect that this is the reason for the concern the garage has expressed. With the Quadra-Drive system, the power will be redirected to whichever axle has traction at that time. So, although the system is permanent four-wheel-drive, it is set up to cope with variations.

Unfortunately, the system was not without its problems and was known to fail for a number of different reasons. After several recalls the problems were ironed out and by 1998 a number of modifications were made. The Quadra-Drive system was replaced in 2003 with the Quadra-Drive 2.

Replacing just two tyres should have no adverse effect on the suspension or the ABS system, or indeed the rate of tyre wear. The small concern is that on the early systems the transfer box was known to suffer, and this may be the basis that the garage is giving this information on. Providing that the two tyres remaining on the vehicle are not close to the limit, and still have plenty of tread, then I would be happy replacing just the two needed tyres.

Indeed, if the two worn tyres are low, and the two remaining tyres are good, then the difference in circumference is already present and will just be reversed, so if this was to effect the ABS system it would already have done so.

JEEP GRAND CHEROKEE

Gear change

Q I bought a 2003 Jeep Grand Cherokee 2.7 CRD so that I could try some light green lanes and take my children through some of the local fords. I've found that if I've stopped the engine for a few minutes sometimes it won't change up from first when I restart and pull away. I'll have to stop, turn the engine off and on again when it should recover OK. If it's been stopped more than half-an-hour all will be fine.

It has a recent new large battery. Haynes doesn't cover this engine/transmission and there's no dipstick to check the fluid level – do you think a fluid change might help?

Also, after I changed the fuel filter it started to get air in the fuel lines. I've now changed all three plastic fuel lines, fitted a one-way valve and viton O-rings, but am still getting air in the fuel and now I can't start it.

These vehicles don't have an electric fuel pump and relies on a mechanical lift pump. Any advice would be greatly appreciated.

Matt Goodrum

The gearbox dipstick available to purchase to check the oil level.

A The engine gearbox configuration in the 2003 Jeep is Mercedes-orientated and just like the Mercedes the gearbox has a dipstick tube with no dipstick. You can get a dipstick from various sources and a search on eBay should find you one for around £10.

I would recommend an oil change and if the oil appears contaminated then it may also be worth changing the strainer in the sump. Depending on which gearbox you have, the 45RFE (5-speed) takes 5.7 litres and the 42RE (4-speed) takes 3.8 litres. These are the quantities for a drain and refill, the actual capacities of the gearbox are 13.25 litres for the 5-speed and 6.8 litres for the 4-speed 'box.

With the mechanical low pressure fuel pump at the front of the vehicle, the bleeding of the fuel system is a common problem on this model. As you have already replaced the VITON O-rings I would consider replacing the adaptor which fits on the top of the filter. The small T-piece adapter may be at fault and these are available for around £20.

Failing this, and as the problem did only occur after the fuel filter was changed, I would consider the possibility that the new filter is at fault and is drawing in air. This is not a common problem but is not unheard of.

SAAB 9-5

Rough ride

Q I have recently acquired a very low mileage 2009 Saab 9-5 which is very clean and handles very well. The ride, however, is poor. On anything other than a new road, I feel every minor bump in the surface through the steering wheel and seats. There's quite a bit of general cabin noise but most troubling is a low frequency irregular thump that gives me a headache. I've had two of these before, albeit much newer at the time and didn't have the same problems.

I've changed the shocks, springs and tyres. Given that it is quite old and likely to have been standing for a lot of its life, before I start down an endless rabbit hole, would you have a list of potential things to have a look at that would potentially return it to a new(ish) car ride, please?

Gerard Bartley

A One of the biggest factors in a comfortable ride is the tyre profile and pressure settings. The tyres on your Saab may be 15in, 16in or 17in and the lower the profile the more harsh the ride will be. Although the tyres have been renewed you may find that the cabin noise is down to tyre noise and different brands do have different decibel ratings.

As you describe the noise as an irregular thump I would check in the area of the anti-roll bar. The anti-roll bar link arms are a common problem and even the slightest wear in the link arm joints can cause an irregular thumping whilst driving on uneven roads.

As you have already gone to some

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expense to rectify the feel of the ride I would replace both of the anti-roll bar link arms and the inner D-bushes on the anti-roll bar – both of these I believe may help improve the ride.

If after renewing the anti-roll bar link arms and bushes, as the shock absorbers, springs and tyres have already been changed and if the tyres can be safely dismissed as being the cause of your harsh ride, then you must consider that the only components in the suspension that could cause further problems are the rubber bushes in the suspension components.

Replacing all of these may be costly but you may wish to try spraying all the associated rubber bushes using a silicone lubricant such as this one: https://bit.ly/CMJAlsS – this may help soften and restore the ride to a newer feeling.

SAAB 9-3

Intermittent battery warning light

Q I have another query for you. The Saab is a 9-3 2006 1.9 TiD 120hp 8 valve (no DPF). The battery not charging light is coming on intermittently. When I put a meter across the battery when the warning light is on, I get 11.7 volts. If I then stop and restart the engine, the light goes off and the voltage across the battery is 13.96V.

I'm guessing the alternator is on the way out, although why all seems fine after a stop and restart is a bit confusing. Can I check anything else to confirm it's the alternator.

My other question is, what alternator am I likely to have, the 130 amp Denso or the 140 amp Bosch? I should also add, this is the second alternator – the first was replaced at 70k – the Saab now has 130k on the clock.

I believe the alternator is tricky to get out from behind the engine. Any tips to make access easier?

Ed Hambley

A The problem may be more to do with the electronic control in the charging system than with the actual mechanical action of the alternator. This would explain why a stop-start restores the charge.

The charging system utilises both the engine control module and the CIM (Column Integrated Module) to control the charge rate. The regulator is integrated with the alternator and so this may well be the problem and given the mileage covered it may be the best step to replace the alternator. From the details I have, the alternator on the Z19 engine in your Saab should be the 130A unit.

The book time given on this job is 1.3 hours and the alternator is quite tricky to access. The description of the work required in the workshop manual, is that the top engine covers should be removed, and the battery disconnected. The vehicle should be supported on stands and the right-hand wheel should be removed, followed by the right-hand inner wing to gain access.

The top alternator bolts should be removed from above, and the auxiliary belt tensioner should be released from under the right-hand wing.

The instructions in the manual are then to disconnect the lower swivel and swing the hub out, disconnecting the driveshaft from the intermediate shaft. After the removal of the alternators lower bracket, and the disconnection of the electrical terminals, the alternator should then be removed.

On refitting the torque settings are: upper alternator bolts 60Nm, lower alternator bracket bolt M8 = 25Nm & M10 = 50Nm, lower alternator bolt 60Nm, the alternator terminals are also given a torque setting of 5Nm for the M5 and 10Nm for the M8.

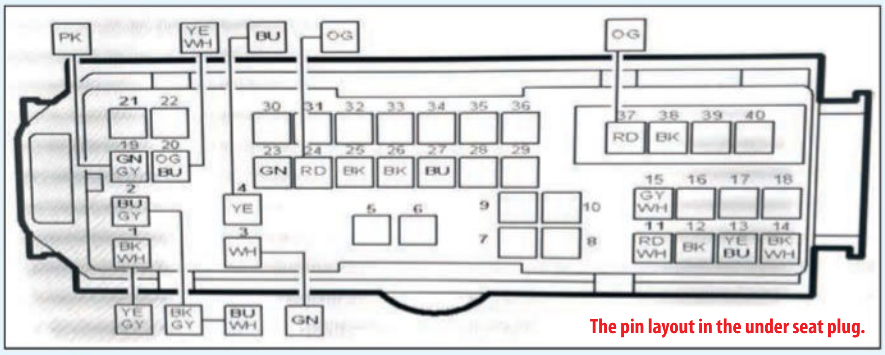
SAAB 9-3

Airbag fault

Q I've owned my 2000 Saab 9-3 Convertible 2.0T SE for several years and it has had an occasional airbag fault that I have previously fixed by removing the driver's seat and cleaning the connectors. However, now the fault can be cleared but soon returns despite couple of further goes at cleaning. I am unable to read it myself, but it has been recorded as B2683 or P2863.

I am considering soldering across the connectors to ensure a decent connection but there are many cores. Could you advise which are the airbag ones please or an alternative suitable repair method?

Matt Goodrum



The pin layout in the under seat plug.

A The code B2863 indicates that the side airbag, driver's side has a wiring, open circuit fault. P2863 is a transmission code and possibly not related. As the airbag light has in the past been extinguished by the cleaning of the plug under the driver's seat, I would agree that this is a connection issue. From the details I have this is a 40-pin connector under the seat that you are referring too, and I would also agree that soldering the complete set of wires to the plug would be unnecessary.

From the data I have, the airbag connections giving the fault should be terminals 1 and 2 on the plug. I have attached an image for you showing the position of these terminals.

The alternative would be to replace the actual terminals in the plug and so I do believe that soldering the cables as you intend to do would be the best option.

I will of course add the warning that the battery should be disconnected during this work, but as you have already on previous occasions worked on the system, I am sure that you are already aware of this.

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BMW 5-SERIES

Diesel filter change

Q I am shortly to replace the diesel fuel filter for the first time on my 2015 BMW 520d F11. As I do not have access to BMW official software, are there any special precautions I need to take to bleed the fuel system and prevent damage to the HP pump?
Melvyn Allen

The inline diesel filter as fitted to the BMW.

A The filter on your BMW should be the in-line type and this is fitted under a plastic shield. This may be towards the rear offside floor area, or the front nearside floor area. Access is gained after removing the plastic shield from below. Once the plastic cover is removed the process is quite easy although it can be a little messy as the fuel will run from the filter once disconnected, for this reason I do advise a good drain tray is used to prevent the diesel from escaping across the floor. The front outlet is connected to the fuel supply hose and the rear of the filter is connected to the fuel heater – this is a U-clip type attachment, and the clip needs to be removed to disconnect this end of the filter. A new washer should be used when reattaching.

Once the filter is in place the fuel can be flushed through clearing any air in the system by using the in-tank pump. This is done by turning the ignition on, leaving for 10 seconds then turning off again, repeating this process around six times should ensure that the air is dispersed. The engine can then be run, and filter should be checked for leaks before replacing the plastic undershield.

BMW 3-SERIES

Engine management light

Q I have recently purchased my 2007 BMW 320i four-door saloon petrol, and it has a few things wrong with it. The management light is on, and the garage carried out a diagnostic test and the fault was the valve-tronic adaption.

Is it just a case of replacing the valve or is the fault somewhere other than that?

I look forward to hearing from you soon.
Richard Honeyborne

A The remedy will depend on the actual code that was read from the code reader, and if the code refers to an implausible signal or a sensor failure, or possibly an adaptive learning fault.

The first check would be to ensure that the connector to the valve is in good order and that the connection to the engine control unit is good. If the circuit does appear to be in a good working condition, then the valve itself is the most likely source of the problem, but this will depend on the code retrieved and the full details of this should be considered.

BMW 3-SERIES

Engine cleaning

Q I have purchased a BMW 320i saloon. The engine needs the oil to be cleaned off the outside of the engine. There does not seem to be a garage that steam cleans the engine. Do you know of any garage that is in the Hertfordshire area that would steam clean the engine?

If you could investigate this matter for me, I would be grateful.
Richard Honeyborne

A I would fully understand why no garage you have approached would steam clean the engine. Because modern engines do have such a large dependence on electronic components any attempt at steam cleaning the engine could result in these components being damaged by the water/steam ingress.

There are alternatives to clean the oil from the side of the engine and using an engine degreaser with a brush to remove the excess would be the best option.

There is a garage not too far from you in the *Car Mechanics Good Garage Guide* – they are:
DC Rogers Auto Repair and are located at Unit 11, Beech Business Park, Tillington Road, Hereford HR4 9QJ and they can be contacted on 01432 264200.

Whilst I would not expect them to steam clean the engine, I am sure that they may be able to arrange a less invasive method to remove the oil from the side of your engine.

BMW M3

Oil leaks

Q My 1998 BMW M3 Coupe 3.2 developed a leak from the oil filter housing gasket which I duly replaced with a genuine BMW part 11421719855. After a short time the leak reappeared and I replaced the gasket again using a febi gasket. I checked the 'freeze' plugs on the side of the housing, and they appeared dry, the oil pressure switch (new BMW) was also dry. I have read on various sites that this gasket can be problematic.

I have purchased a new BMW gasket and I intend to fit it using the following procedure: Remove housing and clean surfaces, fit gasket lightly oiled, locate housing on dowels and ensure the six bolts are in their correct location. Tighten the bolts in star fashion to 22Nm. Does this seem OK to you?

Do you think I should change the seals/crush washers on the so-called freeze plugs? Some suggest tightening the top four bolts first because they locate the gasket, and the bottom two bolts afterwards, what's your view?

Do you think Loctite gasket, a thin bead, should be used in addition to the main gasket? Do these housings have a tendency to warp?
Eddie Gracia

A The procedure you have set out would be the one to take, I have double checked the BMW manual and this does concur with your intended actions. The manual does not give a set tightening procedure for the six bolts, and I would as you intend to do tighten them in a star fashion.

A thin bead of sealant when refitting the housing and gasket would not hurt and I would use Wellseal Jointing Compound.

Unless there are any signs on the seals/crush washers of the 'freeze plugs' then I would leave these undisturbed.

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MERCEDES-BENZ CL500

Oil warning

Q I would be grateful for your advice concerning faults with my weekend car – a 2005 Mercedes-Benz CL500 with engine code 113.960. I have owned the car for four years.

The car had a single fault when purchased being a dash warning 'engine oil-visit workshop' following engine start up. My diagnostic tool (Foxwell NT414) said the signal from the oil level sensor was implausible. I have routinely ignored the warning because the engine has a dipstick, and a replacement sensor was hard to find and expensive.

The last time the car was used for an extended journey and for the first time, the message changed to 'fill with 1 litre oil at next filling station'. The oil level was correct on the dipstick and the earlier warning has since returned. I now wish to renew the sensor and ask if you can set out the procedure. The change in the message suggests that the sensor is at fault rather than the wiring.

Two months ago a new warning appeared on the dash referring to failure of the number plate bulb left and right; a separate message for each appearing sequentially.

I saw that both bulbs seemed to be unlit but upon closer inspection both were blackened, and the left bulb was still working. Both bulbs were renewed but the right-hand bulb still does not light and the message relating to both remains. The right-hand bulb holder appears to be damaged because it is loose in the boot lid. A known good bulb connected directly to the plug supplying the bulb holder remained unlit.

I understand there is no fuse for the VRM plate bulbs, and they are supplied and controlled by a Signal Acquisition Module under the rear seat. I hypothesise that the fault is a broken wire or failed SAM. I would be grateful for your thoughts on further testing and diagnosis. I have purchased a new old stock VRM plate bulb holder and ask if you can guide me through the fitting process.

I am contemplating purchase of a dedicated MB diagnostic tool such as the iCarsoft MB V2 or V3, or Foxwell NT530. A member of the Gendan sales team thought the NT530 would not assist with fault-finding the cause of the unlit number plate bulb but I wonder if you have an opinion about the usefulness of either of these tools (or any other) as a diagnostic aid particularly for CANbus controlled equipment and the ABC suspension on my car. I also own a ML320 of the same age.

Finally, I see that you continue to promote Haynes workshop guides and whilst I can confirm that the earlier books were mostly good, the online Autofix guide for my CL500 is very poor and should be avoided as a waste of money. It provides no more information than the owner's manual and despite claiming to help pass the MOT test it has no information at all on vital systems such as the parking brake. Even worse, information about service items appears to be generic; for example, for the CL it states that the pollen filter is either inside the car or under the bonnet and shows an image of a BMW engine bay. I am still unsure about the location of the pollen filter in my car.

Thank you in advance for your assistance.

Ian Old

A The replacement procedure of the Mercedes-Benz oil level sensor is as follows:

- **The engine cover and the viscous fan should be removed (right-hand thread), then the fan shroud should be removed as well as the air baffle at the base of the fan.**
- **The sump should then be drained down and the engine mount nuts should be removed, the power steering pipe on the left side of the engine will need to be relocated to allow this.**
- **The plastic air filter/induction tubing should then be disconnected from the MAF sensor and removed from the top area of the engine.**
- **The engine should then be supported by crane, and raised slightly, this is to allow the clearance for the sump removal.**
- **The sump oil pan should then be removed allowing access to the oil level sensor fixings. The sensor should be unplugged from the top, then the four Torx screws, securing the two sections of the sensor can be removed.**

The assembly is as said in the manual in reverse order with the torque settings: Sensor bolts – 10Nm, sump pan bolts – 30Nm, viscous clutch to body 45Nm, engine mount 35Nm.

The rear numberplate illumination fault is as you have mentioned very likely to be due to a broken wire, or a partially broken wire which has enough resistance to prevent the correct operation. I would carefully check the loom as it exits the boot lid and enters the boot area, this section of loom is constantly flexed, and is the most likely area of any failure.

Diagnostics via a generic scanner, even one that will read all the other systems on the Mercedes would not detect this fault, but on the subject of diagnostic scanners, whilst the units you have mentioned will be good for the general diagnostics, they will not cover the vast range of systems that the Mercedes STAR diagnostic system will, and whilst I generally like to recommend stand-alone units, in the case of Mercedes diagnostic equipment, a powerful laptop and the STAR diagnostic system is without doubt the best option, it will cover the lights and give a very detailed breakdown of all systems.

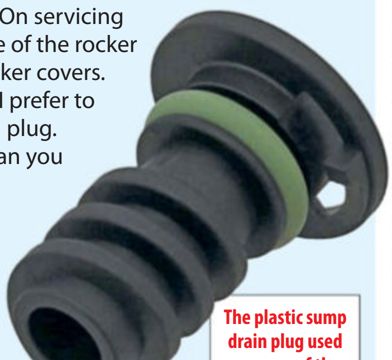
MERCEDES-BENZ E-CLASS

Oil drain plug

Q I have a 2016 Mercedes E350 3.0-litre diesel. On servicing this car there are two air filters, one each side of the rocker covers. Fuel filter sits in between the two rocker covers. I siphoned the oil out through the dipstick tube, but I prefer to drain any car I work on, but I cannot find the oil drain plug.

I have had a good look, but I really am stumped. Can you please shed any light on this for me please?

Martin Duffy



The plastic sump drain plug used on some of the Mercedes models.

A The sump drain plug should be located at the lower offside of the sump and may be either the traditional 13mm headed metal plug, or it may be the later plastic quick release type.

If the sump plug is the metal type it has a torques setting of 30Nm or 45Nm if it is the larger M24 thread. The plastic drain plug which has a screwdriver slot and will release in one turn has a torque setting of 4Nm.

I suspect as you have had difficulty finding the drain plug, that it is the plastic type. This should always be replaced after removing.

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I still remember the first time I experienced a Mercedes plugged into the STAR diagnostics system and could not believe the extent of the detailed information available.

The other alternative is of course using a scope, but again this is a costly option, and the good old-fashioned system of physically checking the loom, may well be the best choice in this case.

The box on the page which references Haynes is something that was added a while back as the situation with accessing workshop manuals is something which is increasingly becoming more difficult. I can add that the other site in the box emanualonline.com can supply the full Mercedes WIS/ASRA system. This is not, I will add, a simple download and does require a modicum of computer understanding to be able to access. The manual is run in a virtual player, and is a large file to download, but once up and running, the full Mercedes manual for both of your vehicles would be accessible.

The pollen filter on your Mercedes is below the glovebox and uses two filters in the upright position.

MINI COOPER

ABS & traction lights

Q You've helped me fix several issues over the years and I need a bit of help again, if possible, please. I've asked you about this MINI before but as the MOT was quite a way off at the time I didn't do much really to try and resolve the problem. The car is a 2004 MINI Cooper 1.6 and has the ABS light, traction control light and tyre pressure light permanently on when switched on. I have a very good Foxwell scanner which shows NO communication with either the ABS module or the steering angle sensor.

I have a BMW specific scanner and that shows exactly the same thing. I have by fluke really found the wiring diagram on the internet. From the systems you have access to which I don't, are you able to confirm at all please which wiring diagram is correct for my car. I think it's the one on page 14 but there are two other ABS diagrams. I know where the ABS unit and steering angle sensor are for when I start checking wiring integrity, etc.

I don't however know where the DSC unit is or the DME unit is.

The MOT runs out on the car in a few weeks, and I love driving it but as it doesn't have a high monetary value, I was hoping to have a go at fixing it myself.

I don't have an oscilloscope unfortunately, but should CANbus signals be around the 2V area? Are CANbus wires referred to as "Computer data lines system" in the diagrams?

Ian Turner

A **To start by answering the question on the diagram on page 14 of the file you sent, this does appear to be the ABS system for your MINI.**

The DSC unit is part of the YAW rate sensor located below the rear of the centre console, and the DME is built into the main ABS pump assembly.

The CANbus system operates at a voltage between 3-7 volts and are the ones referred to as the computer data lines.

From the symptoms you have and with neither diagnostic tool being able to communicate with the ABS system, I would start by checking the multiplug on the ABS modulator. If the terminals are clean and no contamination can be seen, then the problem may be due to an error in the CANbus wiring, and this is something I have encountered before on the MINI.

This can be checked using an ohm meter to check for the resistance in the wiring but does involve a step-by-step testing of each wire to find any break within the loom. Faults can sometimes be detected from slight rust colouring around the loom, and this is indicating that water has penetrated the loom and allowed the wiring to become damaged. Most commonly on the MINI this will occur near the nearside inner wing/bulkhead area where the loom enters the vehicle. This is the area I would pay particular attention to.

If the problem is not within the loom, then the fault you have may be related to a common issue with the MINI and this is a failed steering angle sensor. This will give the symptoms you have – but if this were the case then this should not normally prevent communication with the system. The replacement part number if the steering angle sensor is the fault is 37 14 6 763 916 this should be fitted and recalibrated.

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GENERAL

Scanner advice

The Launch X-431 Euro MOT IV which is a very capable scanner.

Q I am looking for advice on a decent DIY type scanner for my vehicles. These are BMW and Audi at present. I need to replace the swirl flap actuator on my 330d and this needs to be coded to the car using the special adaptions feature so I have been advised. There is a massive number of units out there ranging from £20 to thousands so it is a minefield and don't want to waste money by buying a unit that is not powerful enough.

William Allardes

A **As you say there are a lot of units and the choice is vast, you will be able to eliminate a wide range of budget units that will happily read codes from the engine systems but will not be able to carry out any coding. The need to code pushes the price up.**

The other consideration is to decide if you want a stand-alone unit, or a PC/laptop-based system. Generally speaking, I like to recommend stand-alone units, but if you do have a suitable laptop that you can use in the vehicle, then you will be able to get a more powerful system at a lower cost.

If you are considering this route, then it would be worth talking to Gendan on 01792 588002 as they will be able to advise on the combination of software needed.

The Foxwell GT90 Max Professional Diagnostic System is a standalone unit that will perform adaptations and control module coding and is currently £1195.

Alternatively, the Launch X-431 Euro MOT IV is the optimal entry-level device for diagnostics and will carry out a number of reset and calibration procedures – this is priced at £954 inc VAT from www.launchtech.co.uk

The other option is the growing range of smartphone-based app units that are becoming a serious option and offer a range of features for a minimum cost. Units such as www.mycarly.com do allow for coding and the range of functions is wide. The fee is per manufacturer and is payable annually but when you consider that professional scanners do need the licence renewing after two-three years this is not unreasonable.

TOYOTA AYGO

Cranking fault

Q Would you please advise on a fault I have with a Toyota Aygo 1.0, model KGB, registered March 2009? The Toyota was owned by my brother-in-law who died a few months ago. The family now wish to sell the car and be sure that the fault has been diagnosed and permanently fixed beforehand.

A Foxwell N44 Automaster Pro was used for the diagnostic work. The problem is that the engine will start first crank and run for maybe two seconds typically the time taken to release the key. It occurs identically with both keys.

If you continue holding in the crank position the engine cuts out as before, the engine continues cranking with no sign of any attempt to run. I believe this occurred earlier in the year and initially ran for longer though possible less than a minute, it progressively shortened to the present condition. It was taken to a local garage that was unable to find any faults. It was driven there so normal running had resumed though I don't know when.

I had the car for the pre-MOT check and took it to the test, which it passed with good emission readings. It drove normally while I used it, and I test started it many times with the engine continuing to run every time. It was left unused until the beginning of this month when an attempt was made to start it and give the battery a charge and the above fault occurred. It's the same with the battery fully charged and partially after many attempted starts. The battery was new three years ago.

The owner always felt the car got damp inside when left standing. After standing unused during the COVID lockdowns, the direction indicators and hazards did not function. I managed to get these working after repeatedly operating the indicators and hazard switches. As well as a solidly seized alternator bearing and non-operating passenger front window with their sagas and full stories. We did correspond on the window operation.

My initial thought was an immobiliser problem, but would this allow the car to initially start?

On a diagnostic scan, as shown in the sent photographs, Auto Mode Immobiliser system was No Fault with Engine & ECT 4 faults C2B10 - Refer to vehicle service manual; C0700 - Refer to vehicle service manual (from Internet - EMU problem in injector or wiring, injector circuit). P000A - A camshaft position slow response; B2799 – Engine immobiliser system malfunction. Trying the quick reset failed to reset these codes.

On a manual scan and selecting the module and reading the codes, no codes showed in Current or Pending and only B2799 in Historic. Briefly looking at live data "Air Intake temp" looked correct but I didn't see "Coolant temperature" in the list. Possibly an area to go back and look at more thoroughly.

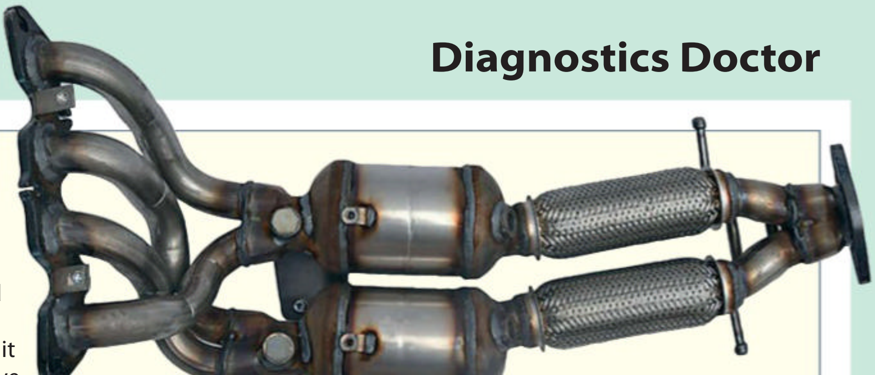
I disconnected the plug to the Transponder aerial around the ignition key barrel. This brought up Aerial open circuit code and the engine cranks but made no attempt to start. Answering my initially thoughts on immobilisation.

I tried disconnecting and reconnecting the battery negative to reboot – no change.

With the key in the driver's door lock, I cycled lock/unlock 10 times to resynchronise the key, though from the above I don't believe this is the problem.

The service manual, like many, does not have a circuit/wiring of the engine management parts, immobiliser or instrument cluster, thus I'm struggling to find wiring and component details. Have you any circuits?

I took out the middle plug and with the coil pack connected and the plug earthed attempted a start. There was a healthy spark,



The twin catalytic converter downpipe/ manifold fitted to the Ford Focus 1.6 Ti-VCT.

FORD FOCUS

Which sensor?

Q I have been asked to look at a friend's 2011 Ford Focus 1.6 Ti-VCT with error code P0430 saying bank 2. I took the Focus for a run, and I thought it was not as quick in acceleration as I thought it might have been, but before I go in and under the car can you tell me a couple of things?

From looking at eBay diagrams of the exhaust system for this model it appears to show two cats with four sensor fitting holes. Any idea which is bank 2 and with the possibility it might have a partially clogged Cat, what are the chances of an in-fuel tank cleaner been effective? Or might it be just a bad Lambda sensor. Any thoughts please?

Steven Tasker

A **The code P0430 is showing that the catalytic converter system, bank 2 efficiency is below the expected threshold. This is indicating that the catalytic converter is not doing the job of converting the gasses and so either the post-Cat sensor is faulty or more likely the catalytic converter itself has failed.**

This system does use four O_2 sensors and bank 2 sensor is the furthest from cylinder 1. The two catalytic converters sit side-by-side and so the O_2 sensor that is referred to in the P0430 code is the one after the Cat on the nearside of the exhaust system.

The O_2 sensor can be checked with an ohm meter and by disconnecting the plug and using the ohm meter between the terminals 1 and 2 (wire colours Blue/White and White/Blue) the meter should read around 9.5Ω. The feed to terminal 2 (White/Blue wire) should also be checked with the ignition on to ensure it reads battery voltage.

If the meter readings are correct then the sensor may not be the problem, and it should be considered that the catalytic converter has failed.

Cataclean does claim to restore performance of the catalytic converter and so may be worth trying before the costly replacement of the catalytic converter, which is a twin unit incorporated into the downpipe.

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which continued as the engine cut out and ran down. There is the normal smell of rich mixture from the exhaust on the brief start.

One thing I forgot to do was to continue cranking the engine after it cut out to check if it still sparked. Something to check out next visit.

Regarding the camshaft sensor, the access is awkward under the cam cover/air filter housing. I was unable to disconnect the plug despite pressing all the various plastic projections. I hadn't taken my needle probes to check via the wiring.

Though the oil is clean, and the vehicle covers a low annual mileage, an oil change is due. If the camshaft/VV timing is slow to respond would an oil change help?

The MIL light goes off during cranking as normal and is not displaying as a fault. Sometimes the ABS and P/S will flash after I have attempted a start though not always and I'd need to test this more fully if it was felt relevant. Generally, all lights extinguish on cranking as expected. Possible something to watch for on extended cranking.

In view of previously suspect dampness, I used a hairdryer over the instrument pack area and engine compartment components and wiring without anything changing. Though the amount of heat was minimal. Any help or information gratefully received.

Barry Ross

A **Looking at the codes that you have read off, this does give the following information. C0700 is a body code referring to automatic suspension. As this system is not fitted on the Aygo this code can be ignored, likewise the C2B10 is a body code referring to a hexadecimal translation of the Toyota system and is not a functioning code so again can be disregarded.**

The code P000A: Intake camshaft position A, bank 1 - slow response, this may be due to sluggishness, and it is possible that an oil change will help. It is though also possible that the actuator has become sticky, I would think that this problem is unlikely to be the source of the starting fault.

The next code B2799 – Toyota: "Engine Immobiliser System Malfunction" is the most likely reason for the starting problems that do occur.

The code B2799 is a Toyota specific code and is set when the PCM (Powertrain Control Module) detects either a communication error between itself and the transponder key, or there is a communication error in the immobiliser system.

It is also possible for this code to be set when the code in the key is not correct, but as the problem occurs with both keys then I would not suspect that an incorrect code is the problem.

This code has no connection to the central locking system, and the central locking and the immobiliser are two separate systems, and so the synchronisation of the central locking would have no effect on the immobiliser system.

The vehicle systems also incorporate a fuel pump shut off under certain conditions, and whilst this should not be the case, it is possible that this shut off system is being activated. When the fuel pump shut off system is activated, it then requires the key turning back to Acc or lock to reset things.

Another possibility is that the crankshaft sensor is failing under the start conditions. This can occur without leaving any codes. The possible reasons are all occurrences that are instigated via the engine control module, and as the module also incorporates a system that will prevent the unlimited cranking of the starter, there are a few scenarios that may be occurring.

The first is that the engine control module does have an internal fault – this can be sent away and tested. The second is that the crankshaft sensor signal is failing, and this would prevent the engine running.

These two possibilities would be the first to check and I would recommend replacing the crankshaft sensor as a matter of course and then if the problem persists sending the engine control module to a company such as actronics.co.uk or remanx.com for testing. I would hope that this would reveal a problem.

Diagnostics Doctor CONTINUED

VAUXHALL ASTRA

Number of faults

Q I have purchased a Vauxhall Astra H 1.6 16v XSi with a failed head gasket. It was pumping water out of the header tank constantly. I have replaced the head gasket, timing belt, water pump and the inlet camshaft pulley (both inlet and exhaust are variable type). There was very minor movement in the exhaust pulley. I have the timing tools to lock the camshafts.

The engine starts perfect, as it did before. The battery light came on intermittently, then one day stayed on permanently and the battery drained. I replaced the alternator with one from a breakers yard, the battery is now charging fine. The car was not driven, just started and stopped numerous times in the position it was left while being worked on. It no longer blows water out from the header tank, heaters are hot.

I took it out for a test run today and noticed straight away that it is badly down on power. I don't know if the car was like this when I first purchased it as it was dropped off to me on a trailer. It's as if it's pulling a big trailer but it isn't, all wheels are free and not binding.

I have also noticed that the cooling fan cuts in when I'm driving the car, but this could be down to the coolant thermostat circuit valve low voltage if the thermostat isn't opening correctly as I believe it's electrically controlled?

I have a Launch X431 scanner, so I scanned the car and got the following codes present: U0009-70 Can Bus Node no communication, P0141-02 O_2 sensor heater circuit low voltage (bank 1 sensor 2), P0135-02 O_2 sensor heated circuit low voltage (bank1 sensor 1), P0010-02 Intake camshaft phasing power stage circuit low voltage, P0075-06 Intake manifold solenoid valve 1 circuit low voltage, P0443-02 Fuel tank ventilation valve low voltage, P0507-02 coolant thermostat valve circuit low voltage, P0013-02 Exhaust camshaft phasing power stage circuit low voltage.

I think I might have a ground or power fault but unsure where to start. There is a ground at the ECU on top of the engine. I have cleaned that and also a ground at the side of the cylinder-head which I have also cleaned (it looks like someone has added a lead with one eyelet at each end and connected this to the cylinder-head (where the factory earth also is and to the engine lifting bracket).

I am getting 13.9-14V at the battery with a multimeter and through the scanner. I have swapped the inlet manifold solenoid with one from another Astra I've got, and it made no difference.

The inlet manifold valve appears to be working fine despite the error as it shows inactive and active when the throttle is pressed. I have sent some videos. I have an identical car, same year, same engine that I could swap parts if required for testing purposes.

After further checks, I found a blown fuse for engine electronics number 26 in the engine compartment. I replaced this 10A fuse and it pops as soon as the key is turned on. Someone has marked that fuse in the book with pen so have been there before. I then used a 15A fuse as that's all I had at that moment and discovered that the exhaust camshaft solenoid was smoking so I turned the key off and disconnected that. I then walked up the road to get some more 10A fuses from a scrap Subaru. I fitted the 10A fuse and slightly connected the plug in the solenoid, it smoked then popped the fuse.

I fitted a new fuse and left that solenoid plug disconnected and the fuse no longer blows.

I rescanned the system and the only code on now is for the intake air temp sensor, it's shows -40 constantly. I have now discovered that one of the two Brown wires at the intake air temperature sensor was broken right flush with the plug. I will repair this tomorrow.

I test drove the car, but it is still down on power. I have now fitted a replacement solenoid to the exhaust side and the fuse no longer blows. I have rescanned the car, only the intake air temperature sensor fault now shows and after a test drive it seems to have more power and both VVT solenoids are working. So I'm getting through the issues now.

VAUXHALL INSIGNIA

Imbalance cylinder

Q I have a 2016 Vauxhall Insignia 1.6 diesel Ecoflex. The engine management light has come on, I have had it scanned, and it comes up with: Imbalance number 1 cylinder. My local garage is at a loss to explain this, please could you help?

Steve Lippiatt

A **I suspect given the explanation accompanying the code that you have been given that this is the code P0263, indicating that cylinder 1 has a contribution/balance fault. This means that the cylinder is not contributing to the power output of the engine at the same level as the other cylinders. This is detected by the ECU during running and is calculated by the data received from the engine sensors.**

This may be due to an injector fault or the operation of the injector, which could indicate a wiring loom issue.

The first step in the procedure would be to check the source of the problem and to inspect the wiring to the injector and ensure that this is good. If the wiring can be confirmed as good and the possibility of a circuit problem can be eliminated, then a leak-off test on the injectors may be beneficial to test for a weak injector.

The fault may also be due to a code such as P03A6-P03A7 or similar. This would be indicating that the cylinder pressure as read by the pressure sensor in the injector is not equal to that of the other cylinders.

If this is the case then the remedy may be to replace the injector relevant to the cylinder that is being indicated by the code – in this case, as the garage have identified cylinder one, then this would be the injector to replace.

As a precaution before replacing the injector, it would best practise to check the compressions of the cylinders to ensure that the fault is not a mechanical problem such as a valve seat. Providing this can be confirmed, then the injector would be the most likely reason for the problem.

The other question I have is, do you know what temperature the thermostat is meant to open at and what temperature the fan is meant to cut in?

I have found the fan cuts in at 110°C but cuts out at around 108°C. I thought it would have run for longer, but the temperature keeps dropping down to around 103°C with the fan off then builds back up again. The other day the fan was cutting in at 106°C.

James Fraser

A It would appear that you have already discovered the source of the problem causing much of your power loss, and the low voltage codes. The drain from the camshaft solenoid, would have been the source of these problems, the incorrect reading from the air intake temperature sensor may be due to the sensor itself or a connection fault, and this may be the reason for the power loss that you have mentioned.

The thermostat should open at 90°C if the electrical type or 105°C if the thermal type. The workshop data suggests that the engine temperature when running should sit between 80-110°C and that the fan will be active above 107°C.

As the fan does appear to cool the engine to a sufficient level then It does suggest that this is working correctly, although it may also be worth checking the sender unit to ensure this is giving the correct readings.

The data I have for this is as follows: With the plug disconnected and using an ohm meter between the two terminals, the readings on sensor 1 (Blue/Red and Brown wires) should be: with a coolant temperature 26°C the meter should read 2271 Ω, with a coolant temperature of 100°C the meter should read 155 Ω. The readings on sensor 2 (Blue and Brown/Grey wires) should be: with a coolant temperature of 26°C the meter should read 2925 Ω and with a coolant temperature of 100°C the meter should read 430 Ω.

VOLKSWAGEN CADDY

Flashing light

Q Travelling in my 2012 VW Caddy 1.6 TDI at 60-65mph for 50 miles should hopefully clear the soot from the DPF? While in a small traffic jam later, the glow plug light started to flash. The important thing to note is that there was no loss of power, no limp-mode. I decided best to pull over at the first chance to switch the engine off and hopefully the ECM would reset itself to stop the glow plug light flashing. This happened again a few miles up the road in slow traffic. Pleased to say switching the engine off each time it went out.

I have attached the VCDS file for you to look at, if you can let me know what you think may have triggered this fault? The code was 7286 - Turbocharger Boost Control Position Sensor Circuit. P2563 00 [01100000] Implausible Signal.

Mo Thomas

A The two main sources of the code you have are either the wiring or the TC boost control position sensor. As you have sent me problems in the past that were similar, I do expect that the issues may be with the wiring and so I would check the circuits through to ensure that this is not the source of the problem.

As the fault does reset on the turning off and the turning on of the ignition, this does suggest an electrical fault that is reset. I would recommend that the connections and the engine loom are checked for any high resistance or open circuit.

If no problems can be found, then it may be worth having the ECU sent away for testing – this may be an internal problem.

Diagnostics Doctor

Diagnostics Doctor is a **FREE** helpline service for *CM* readers – including trade readers – who are struggling with diagnostic/engine management related faults.

Steve Rothwell will answer all your queries. He will need as much detail as possible: **MAKE, MODEL, YEAR, ENGINE CODE** and **NUMBERPLATE** of your vehicle – and the type of management system installed. Obviously, Steve will not be able to assess the vehicle up close, so his answer will be on the basis solely of your description. This is a FREE service and it may take some time to respond to certain problems. If you would like to receive a personal response via post, please enclose an SAE.

e-mail:

cmdiagnostics@yahoo.co.uk

Write to:

DIAGNOSTICS DOCTOR
CAR MECHANICS,
KELSEY MEDIA,
THE GRANARY, DOWNS COURT
YALDING HILL, YALDING,
KENT ME18 6AL

Common abbreviations

ATS	Air Temperature Sensor
AFM	Air-Flow Meter – not a MAF type (see below). It could be, for example, a vane type
CAS	Crank Angle Sensor
CPS	Crank Position Sensor
CTS	Coolant Temperature Sensor
ECT	Engine Coolant Temperature
ECM	Electronic Control Module
ECU	Electronic Control Unit
EGR	Exhaust Gas Recirculation – meters exhaust gas back to the intake manifold
EML	Engine Management Light
EMS	Engine Management System
EPC	Electronic Power Control
EVAP	Evaporative Emissions Control System
FCR	Fault Code Reader
HT	High Tension – ignition output to the spark plugs
IAV	Idle Air Valve
ISCV	Idle Speed Control Valve – usually operated by a motor controlled by the ECU
LOS	Limited Operating Strategy – if the ECU detects a malfunction, it runs a programme to allow the car to still go, but at reduced efficiency
MAF	Mass Air-Flow meter
MAP	Manifold Air Pressure
MIL	Malfunction Indicator Lamp
PCV	Positive Crankcase Ventilation – takes crankcase gases and recycles back to the inlet system
TBPS	Turbo Boost Pressure Sensor – used by the ECU to regulate turbo output
TPS	Throttle Position Sensor
VSS	Vehicle Speed Sensor
WOT	Wide Open Throttle

Electronic Diagnostics

VW Beetle 2.0

Tracing and fixing faults in electronic engine management systems

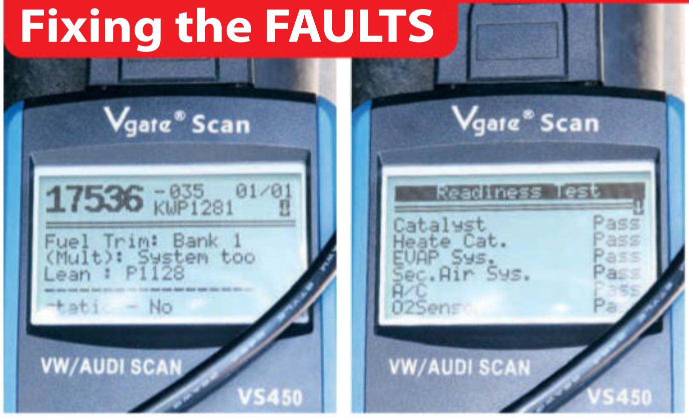
PART THREE: In the final instalment relating to the diagnostic disasters surrounding a 25-year-old Beetle, **Rob Hawkins** is confident he has finally fixed everything, or has he?

It's always dangerous to tempt fate by claiming you are confident a car is fixed, especially one that is a quarter of a century old, such as the Volkswagen Beetle seen here.

In the last issue of *CM*, we fitted a spacer to the post-cat oxygen sensor, replaced a collapsed vacuum hose and tested the EVAP system, but the EML kept reappearing on the dashboard.

Armed with all our findings, we wondered whether the efficiency of the pre-cat oxygen sensor was

Fixing the FAULTS



```
17536 -035    01/01
      KWP1281
Fuel Trim: Bank 1
(Mult): System too
Lean : P1128
-tati  - No
```

```
 Readiness Test
Catalyst       Pass
Heate Cat.     Pass
EVAP Sys.      Pass
Sec.Air Sys.   Pass
A/C            Pass
O2Sens         Pa
```

1 Confident there were no issues with the EVAP, we were shocked to see the EML switched itself off but returned after some 200 miles with the same old pattern of fuel trim issues concerning Bank 1 being too lean. But this time, the Readiness Test passed.

2 Mark questioned whether the pre-cat oxygen sensor was to blame, so we ordered a new one from febi and borrowed one of his ramps. At first, we weren't confident we could replace it, finding it tucked away down the back of the engine bay.

3 Mechanic Pete at AES lent us his box of oxygen sensor sockets, which saved the day. Armed with a 3/8in ratchet drive that had an angled head, we successfully slackened the old pre-cat oxygen sensor.

4 Harrogate College student Joshua Wilson had joined us for the day, so helped to trace the wiring for the oxygen sensor and disconnect it, then fed it through to remove the complete assembly.

dubious and the cause of the EML illuminating. We'd noticed that fault code P0134 had been logged, which is described as no activity for the oxygen sensor circuit (Bank 1, sensor 1). Had the wiring to it broken down or had the oxygen sensor failed?

Switched off

We ordered a new oxygen sensor from febi and whilst waiting for it to be delivered (the weekend got in the way), the Beetle was driven for another 75+ miles, after which, the EML mysteriously switched off (we had decided to leave it illuminated instead of clearing the fault codes).

Then, as we approached the 200-mile mark since the EML had mysteriously switched off, it reappeared! The familiar-looking fuel trim issues concerning Bank 1 and the system being too lean had been logged (P0171). Surprisingly, the Readiness Test revealed that every component passed. The fault codes were cleared to see what would return and when.

Everyone involved was optimistic that we were getting closer to solving the Beetle's problems, but agreed that the EML had to remain off permanently, not for a few hundred miles.

A new pre-cat oxygen sensor had arrived from febi, so we returned to AES to borrow their ramp to fit it, and brought along a student from nearby Harrogate College, Joshua Wilson. Mark wondered whether the pre-cat oxygen sensor was unreliable, but with it working fine for most of the time, it was impossible to diagnose.

Despite being tucked away inside the back of the engine bay, we managed to access the pre-cat oxygen sensor from underneath and replace it. Mark recommended clearing the fault codes – the EML wasn't illuminated, but delving into the VAG settings on the Vgate FCR, we discovered fault code 17536 was pending, which related to fuel trim issues with Bank 1 being too lean. And to our horror, the Readiness Test now listed failure of the cat, EVAP, secondary air system and both oxygen sensors! What was going on?

All we could do was test-drive the Beetle and see what would be logged. Refuelling showed that fuel consumption was now at 32mpg, and a drive to the east coast of Yorkshire and back racked up another 170 miles since leaving AES, with no sight of the EML, but connecting the fault code reader revealed the same old pending code relating to system too lean, although the Readiness Test now passed with flying colours.

What now?

Whilst we felt confident we were getting close to fixing the Beetle's EML-related problems, we hadn't pinpointed the exact cause. Mark at AES commented that we'd unpicked and fixed all the previous mistakes and were probably now investigating the original fault. However, that's not to say that new faults may arise and contribute to the problem. So, perhaps the collapsed vacuum hose for the secondary air system had been there all along, the leaky oil filler cap seal had only been momentarily fixed, and the occasional failure of the pre-cat oxygen sensor was a new emerging issue. All of these, along with the aftermarket cat being not as efficient as a genuine cat, seemed to contribute to the pattern of fault codes that was now being narrowed down to Bank 1, system too lean.

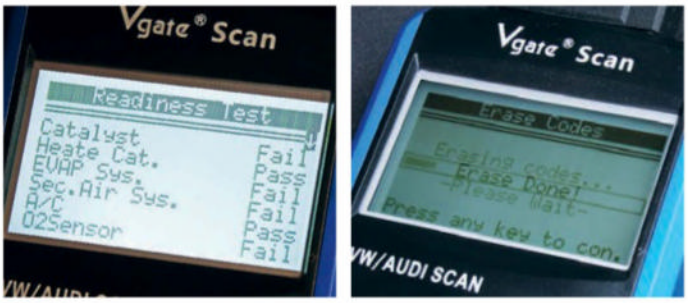
THANKS TO
AES York Limited
01904 780149
autoelectricsyork.co.uk

MJ Motors (Batley)
01924 472404

5 **Comparing old and new, we double-checked the replacement oxygen sensor from febi had the same thread, plug connector and length of wiring before fitting it. A fine coating of grease had been pre-applied to the thread.**

6 **Joshua manoeuvred his hands into position and fitted the new oxygen sensor, making sure the wiring didn't become twisted. Using a torque wrench, it was tightened to the recommended 50Nm.**

7 **He then routed the oxygen sensor's wiring underneath the Beetle, securing it in several metal clips, but also fitting a couple of cable ties, then attached the connector plug.**



```
Readiness Test
Catalyst       Fail
Heate Cat.     Pass
EVAP Sys.      Fail
Sec.Air Sys.   Fail
A/C            Pass
O2Sensor       Fail
```

```
Erase Codes
Erasing codes...
Erase Done!
-Please Wait-
Press any key to con.
```

8 **Mark advised us to connect the Vgate fault code reader and reset the fault codes, despite the EML was off. The familiar system too lean was pending and to our surprise, the Readiness Test failed on most points. 170 miles later, the Readiness Test passed with flying colours, but the too lean issue remained pending.**

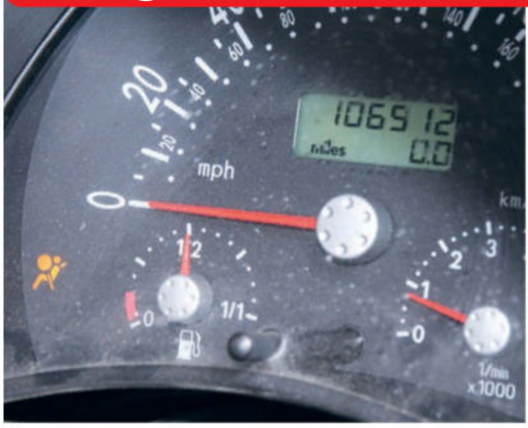
However, let's not forget the fact that new problems may come along, and they did. A couple of days after replacing the pre-cat oxygen sensor, on a warm evening and after not having started the engine for a couple of days, it started, but after 2-3 seconds, it died. A couple more attempts at starting the engine resulted in the same issue – it fired willingly into life but died soon after. Attempt number four saw it run fine, and the problem didn't return until over a week later when this time, the engine ran fine on the first start, but the car was only moved forwards a few metres and the engine was purposely switched off to load up the boot. Upon trying to start the engine again (no more than 10 minutes later), it took four or five attempts, displaying the same problem of firing into life for 2-3 seconds.

We initially wondered whether there was a cold-start issue, but with no logged faults, there wasn't much to look for. Perhaps an intake air temperature sensor was faulty. Owner Simon Goldsworthy had commented that the engine seemed to run rough at idle when cold, and we also witnessed this, although it was fine under acceleration. He'd gone to the lengths of replacing the throttle body.

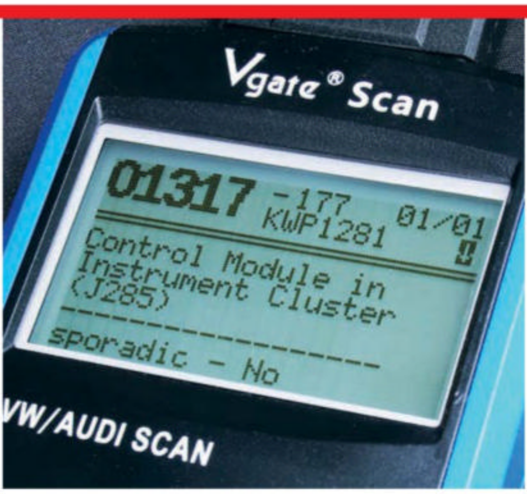
More was revealed when the last cold-start symptoms occurred, resulting in the airbag warning light being permanently illuminated and the tripmeter being reset to zero.

Plugging in the fault code reader and looking at the airbag-related section showed that fault code J285 had been logged, which concerns a communication problem with the instrument cluster. Thinking, or perhaps hoping, this could

Fixing the FAULTS CONTINUED

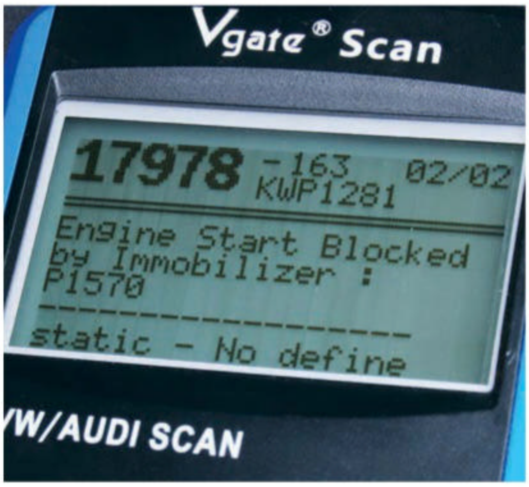


9 ◀ **Over 200 miles since replacing the oxygen sensor, a cold-start issue arose, whereby the engine would start, but cut out after 2-3 seconds. On one occasion, the tripmeter reset to zero and the airbag warning light appeared.**



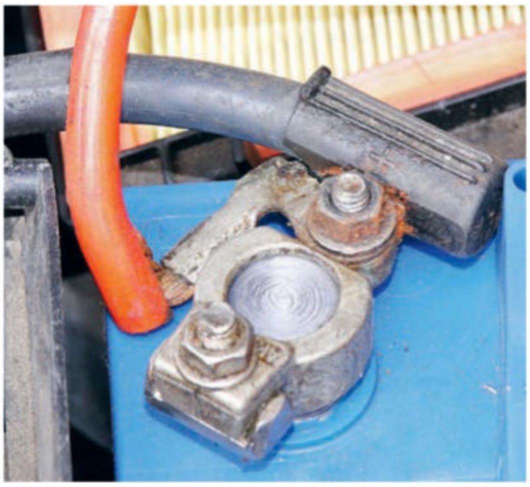
```
01317 -177        01/01
      KWP1281
Control Module in
Instrument Cluster
(J285)
----------------
sporadic - No
```

10 ▶ **Using the Vgate scanner, we looked at the airbags and found fault code J285 had been logged, which is a communication problem with the instrument cluster. We reset the faults to see if it would return. If not, it could have been an anomaly.**



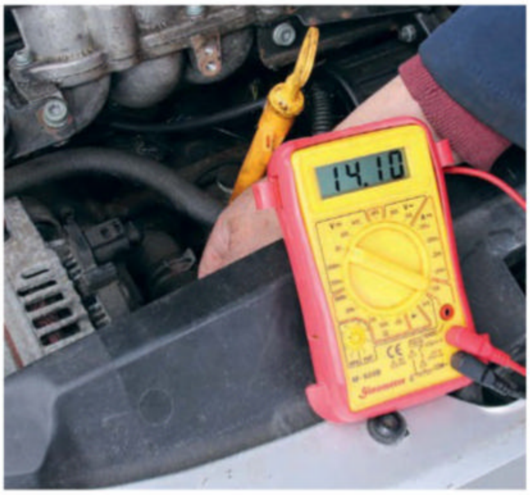
```
17978 -163        02/02
      KWP1281
Engine Start Blocked
by Immobilizer :
P1570
----------------
static - No define
```

11 ◀ **Meanwhile, we looked at the engine fault codes, and whilst the now familiar system too lean was pending (P1128), P1570 was also listed, which is described as the engine start being blocked by the immobiliser. This explained the cold-start problem.**



12 ▶ **Feeling curious as to why the tripmeter had reset itself, we wondered whether there had been a significant voltage drop, which triggered fault code J285. Looking at the 12V battery, we spotted the live lead was kinked, so adjusted and straightened it.**

13 ◀ **The 12V battery had been renewed by owner Simon Goldsworthy, so it was no more than a couple of years old, but we still tested it and found it was in good condition.**



14 ▶ **And with the engine running, we measured the voltage at the alternator to make sure it was capable of recharging the battery. We found a little over 14V, which was sufficient.**

be an anomaly, we reset the fault codes to see if it would return.

We also looked for any engine-related fault codes and whilst the now-familiar P1128 was listed (fuel trim, Bank 1, system too lean), a new one was also pending – P1570. This is described as the engine start being blocked by the immobiliser.

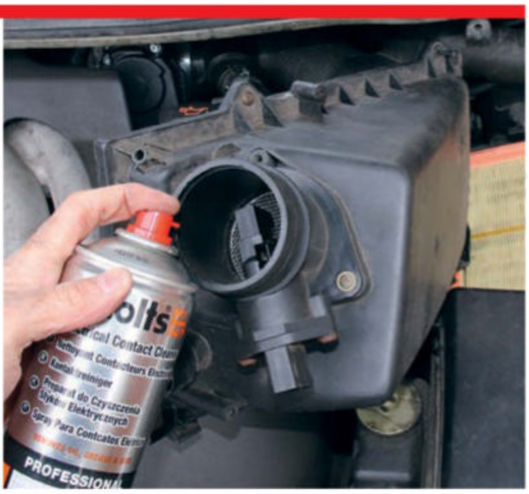
Looking online at what P1570 means to other people who have experienced this, it seemed to suggest a problem with a voltage drop. Some people had found it to get worse, resulting in the engine not starting at all (ie. it fired, but died after 2-3 seconds), but they resolved the issue by disconnecting the 12V battery (and in some cases, discharging any remaining charge by connecting the positive and negative cables together). With the issue pointing to the battery, but knowing it had been renewed within the past two years, we inspected it and noticed the live lead to it was kinked close to the terminal. Had this caused a voltage drop? The live lead was straightened to see if it made a difference, although we realised the damage may have already been done. We tested the battery and found it healthy.

Several people suggested an earthing problem that had caused the electrical gremlins. So, we tried to find the earth points on the vehicle and inspect them. The only difficulty we faced was the fact that the electrical problems were not consistent, so it was like looking for a needle in a haystack.

The cold-start issue never returned thereafter, although the only anomaly that could be linked to a voltage drop and communication issue was a few weeks later when the radio lost all of its preset stations.

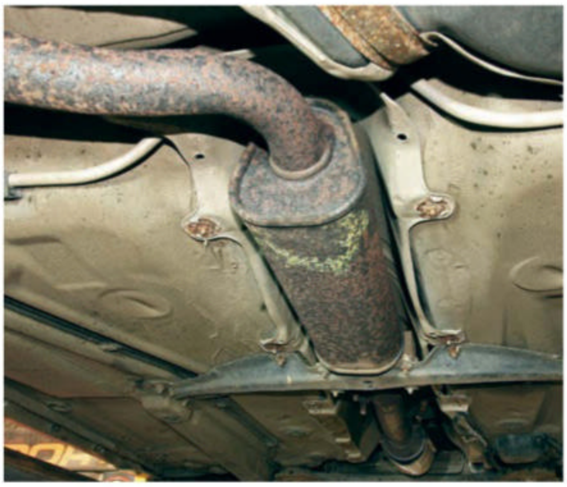
15 ◀ **We still had to try to resolve the system too lean issue, which could have been caused by the spacer on the post-cat oxygen sensor, but we conducted some routine checks, making sure the air filter was clean (it was)...**

16 ▶ **... and the MAF sensor was cleaned by spraying a little contact cleaner inside it. The MAF sensor is attached to the outlet of the air filter housing's lid, so it was straightforward to see inside it without having to remove it (we removed the lid of the air filter housing).**



17 ◀ **With one month to go before the Beetle's MOT certificate expired, it was tested at our local garage, MJ Motors, and only failed on a bush for the offside front lower suspension arm.**

18 ▶ **A small hole was spotted in the exhaust system's mid-silencer at the MOT test. A few weeks later, the exhaust was starting to blow from here, so it was clearly time to replace the silencer.**



19 ◀ **We sourced a replacement mid-silencer, but realised the old one was part of the rear silencer. We needed to cut and sleeve the new one into position, so had to figure out the size of sleeve needed.**

20 ▶ **Armed with a pair of digital Verniers, we measured the internal and external diameters of the new mid-silencer's pipes and where it would be fitted onto the old exhaust system. A suitable sleeve was ordered and delivered.**

MOT test

Meanwhile, the MOT test was looming and although we were confident the Beetle would pass the emissions test, would there be any bigger issues to put the final nail in its coffin? Having inspected it on the ramp at AES, we were surprised by the condition of its underside, especially the corrosion. It was relatively clean for its age, and we could only spot a couple of repair patches on the rear ends of the sills. Even the MOT advisory from 2024, noting the rear coil springs were corroded, wasn't too catastrophic.

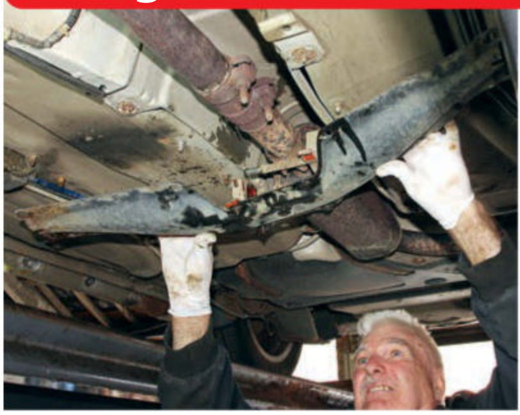
The Beetle's surprisingly minimal amount of corrosion is perhaps down to having a galvanised steel body and plastic wings.

The MOT test almost passed without a hitch. A worn rear mount for the offside front lower suspension arm was the only fail point, which was fixed with a new complete assembly instead of replacing the pressed-in bush. The MOT tester did notice a small pinprick-sized hole in the exhaust system's mid-silencer, but it wasn't enough to raise the Lambda reading on the emissions test to fail it, and the silencer wasn't blowing.

However, the exhaust issue wasn't going to fix itself, and over the next few weeks the noise of it blowing became prominent. A complete rear assembly, consisting of a mid-silencer and rear silencer was already fitted to the underside of the Beetle, so the mid-silencer section had to be cut to fit a replacement.

After four months of driving and fixing the Beetle, is the battle over? For now, it seems so, although as this final episode goes to press, we've noticed a new cold-start issue, where the throttle pedal sometimes needs a little feathering to keep the engine running.

Fixing the FAULTS CONTINUED



21 ◀ **Mike Smith at MJ Motors pointed out that this support bracket (crossmember) for the exhaust needed to be removed. It was secured to the underside of the Beetle with eight 13mm nuts. Two rubber mounts for the mid-silencer's locating pegs were detached.**

22 ▶ **Mike sliced through the sleeve at the front of the mid-silencer using a cordless angle grinder and a suitable cutting disc. He then manoeuvred the sleeve off and detached the front of the mid-silencer.**

23 ◀ **Allowing the old mid-silencer to hang down (it was still attached to the rear of the exhaust system), the new mid-section was connected to the front of the exhaust system to help see where to cut the old mid-silencer.**

24 ▶ **First, the mid-silencer was cut from the rear exhaust system leaving more exhaust pipe than needed to join it to the new mid-silencer. We could then measure up more easily and cut off the excess, starting with a cutting disc and finishing with a reciprocating saw.**

25 ◀ **A sleeve was fitted to connect the new mid-silencer to the rear of the exhaust system and at the front, a clamp was used. Joshua Wilson had joined us and helped refit the mounting bracket, then progressively tightened the sleeve and clamp, checking the exhaust didn't foul anything.**

26 ▶ **Looking at the old mid-silencer, it certainly needed to be replaced. The outer casing was breaking up and the hole was hard to miss. This would have soon affected the exhaust emissions.**

FREE ADS

Car Mechanics offers a **FREE** classified service **FOR PRIVATE SELLERS ONLY** who wish to sell-on their **UNWANTED CARS** and **PARTS**, or for those who need a specific item.

Simply type out your details, add a contact telephone number and, for our reference only, your home address. We will even print a **PHOTOGRAPH** (subject to space). Plus whether you want the advert to run **one** or **two** issues?

WE REGRET WE CANNOT TAKE ADVERTS OVER THE PHONE.
THIS CLASSIFIED SECTION IS STRICTLY FOR CAR-RELATED ITEMS.

SEND YOUR DETAILS VIA:

EMAIL: martyn.knowles@kelsey.co.uk

CARS FOR SALE

JAGUAR XE. 2016. R-Sport 2.0 petrol. Recent brakes and service at MOT. Desirable colour and spec. Was accident damaged to the n/s/f and n/s/r door, no structural damage. Vehicle has been professionally repaired. **£6500**. **07788 581568**. Cardiff.

SAAB 900 2.0 Turbo 16v SE Convertible. 1997. Leather. 93,728 miles. FSH. 4 new tyres July 2023 – driven 10 miles. Needs recommissioning. Too good to scrap. **£400**. **07501 354586**. Kent.

VW GOLF Mk3 CABRIOLET. 1996. Red/black cloth trim. 67,000 miles only with a box full of history, very original car. Recent MOT, autobox, electric hood. **£3000**. **01652 678417**. Yorkshire.

BMW 116i SPORT. 2009. 104,000 miles. Black. 2 owners, service history, aircon, electric windows. Grey interior, CD player, alloy wheels, MOT. In immaculate condition. **£1995**. **07527 446242**. Wales.

TOYOTA COROLLA VERSO. 1.6 VVTi T2, petrol, manual, 146,000 miles, silver, 7-seater, ULEZ compliant. MOT until Nov 2025. **£900**. **01494 712554**. High Wycombe.

PARTS FOR SALE

GOLF Mk6 PARTS 2009-2012. 1.6 FSI service items, oil/air/pollen filters, etc. 2.0 GTI (4-dr model), front struts/coil springs/wheel bearing housings/front hubs. Nearside front door (complete no rust). Rear wheel bearing/transverse links/trailing arms/shock/coil springs. Brake discs/calipers. All parts intended for rebuild of project car. **£120** to clear (offers?). **07856 284613**. Essex.

RACECHIP GTS (German) **TUNING BOX** for Ford Fiesta 1.0 EcoBoost (99hp version) 2013-2017. **£105** incl postage. **01298 214110**. Buxton.

FORD 1972-1997 PARTS. Chassis, engine, body parts, Puma Mk1, Cortina Mk5, Escort, Transit, Fiesta, Ka, Granada. 7 boxes of spares – clearing my Dad's garage (after his passing). **£100** to clear. **07856 284613** for further info. Essex.

BMW MINI TYRES. 4 x 2025 tyres (Hankook 16in). Buyer collects. Less than 500 miles on them. 195/55/16. **£100**. **07387 791553**. Perthshire.

PAIR BRAKE DISCS for SEAT, Skoda, Volkswagen. Apec part number DSK2946. Pair **brake drums** for Volkswagen part number 1SO 609 617. Pair **rear brake shoe** assemblies part number 6C0 698 620. Two VW drive belts part number DAY 04E 109 119C. All parts new and unused. Car owner died before he could fit them. I'm selling them for his widow. Sensible and generous offers please. Parts are in Bristol, can be collected or sent by carrier. Contact Barry Cash on **0117 942 5986** or email: **barrycash@uwclub.net**

CARS FOR SALE

FORD FIESTA 1.4 GHIA. 2003. Metallic black, cream velour. Low mileage of 36,000. MOT 10 months. **POA**. **07714 263355**. Scotland.

JAGUAR S-TYPE V6 SE. Auto. 2006. Black, cream leather. 62,000 miles. FSH. One years MOT. Excellent condition. **£3250**. **07714 263355**. Fife.

CLASSIFIED DEADLINE for SEPTEMBER 2025 issue: July 30th

The sheer number of visitors and exhibitors proved that the independent motor trade is open to tackling the challenges of the future.

AUTOMECHANIKA BIRMINGHAM

NEC, 3rd-5th June 2025

The motorcar repair trade has been giddy with excitement, awaiting the UK return of the Automechanika trade show, but was it worth the wait? **Rob Marshall** visited the NEC to find out.

Whether you are a technically-interested driver, a keen DIYer, or a professional technician, it is not unreasonable to presume that you are in contact with at least one garage. This being the case, you might think that things have never been better. With so many owners holding onto their cars for longer, many independent workshops are booking customers weeks in advance and, in some cases, turning work away. It is an enviable situation – or so it would seem.

Not so rosy?

Yet, there are problems. The latest cars, especially, are becoming harder to repair both literally and figuratively. While high-voltage and Advanced Driver Assistance Systems (ADAS) require special training and equipment, even relatively mundane work includes the need to access data from car manufacturer portals, which can be considerably more challenging than it should be.

Then, there is recruitment. Professional technicians are leaving the industry and not being replaced by bright young things, resulting in the car repair industry haemorrhaging talent at both ends. The fact that many garages are simply too focussed on not letting their existing customers down, means that many of them cannot find the time for extra training, let alone the luxuries of networking, or attending, trade shows.

You might conclude, therefore, that the car repair business is reluctant to change, too flustered to innovate and too busy to even want to grow. Automechanika Birmingham proved this emphatically not to be the case.

Good indications

For starters, over 15,000 visitors packed the NEC over the three days, comprising over 7000 trade businesses. Approximately 550 exhibitors from over 35 countries participated in live demonstrations, shared updates in repair techniques, showcased the latest equipment and even conducted live training. In many ways, these increasing numbers are reassuring, because they indicate that COVID, Zoom and Teams have not wiped out the desire for face-to-face interaction.

This is not the first Automechanika to have been held in the UK and it was positive that the organiser, Messe Frankfurt, had reintroduced some old favourites. These included the Aftermarket and Workshop hubs, the Spray and Paint Live area, plus live vehicle detailing demonstrations. Networking opportunities included the Independent Automotive Aftermarket Federation's Women in Automotive drinks reception, not forgetting the Society of Motor Manufacturers and Traders' (SMMT) Meet the Buyer programme that facilitated high-level procurement conversations.

Looking forward

Exhibitor highlights included Castrol winning the show's Best Stand/Engagement award with its three stages, at which visitors could win Melvyn Evans Motorsport Rally Team and Castrol 'Castronomy' merchandise, as well as an ATF Transmission Flush Machine, costing over £3000. Its technical stand also highlighted how to select the right oil, which is becoming increasingly tricky for modern cars. Emphasising this point saw Castrol's leading UK distributor, the Race Group, providing a live speech at the Workshop Hub arena. Niterra (the maker of NGK spark plugs and NTK sensors) bagged the Best Stand prize, which celebrated the firm's 50th anniversary and included a guest appearance by Charlie Martin and racing driver Max Coates. You may have noticed that Alliance Automotive, especially with its 'NAPA' and 'APEC' brands, have expanded significantly in the last few years, and its impressive stands earned special recognition from the organisers.

Innovation4Mobility comprised an educational theatre that provided an insight into the future of digital technologies. These included connected and sustainable features that are becoming increasingly popular among vehicle manufacturers. Topics that we have featured before were discussed, such as vehicle-to-vehicle Swarm Intelligence and vehicle-to-manufacturer over-the-air software updates.

Motorvating a new generation

Obviously, Automechanika is a trade event and not a car show for the general public. Yet, members of the public were not entirely locked out. Responding to the recruitment challenges that the car repair industry faces was 'Motorvate' – a new initiative for 2025. This hands-on careers and skills hub was created to inspire visitors of all ages and bridge the gap between formal education and employment. Furthermore, it showcased the variety of employment opportunities that the motor industry offers, including diagnostics, logistics, engineering, marketing and customer service.

Motorvate's less formal festival-type atmosphere attracted thousands of students, apprentices, business owners and trainers. Imaginative interactive activities included Bosch's *Find the Fault* diagnostics challenge, Autotech's *Beat the Pro* racing simulator, and the Insitute of the Motor Industry's *Skills Competition* showcase. Career advice talks included how to start, progress and advance a career in motor vehicle mechanical, electrical and body repairs.

Central to Motorvate was the Ignite Arena. Bosch Training Solutions, Autotech Academy, Kwik Fit, Castrol, LKQ Euro Car Parts and even the Toyota & Lexus Academy were among well-known firms that formed debate groups, participated in interviews, offered informal talks and facilitated student panels.

While its role was to entice new people into the aftermarket motor industry, Motorvate supported and celebrated those who work within the industry.

Automechanika Birmingham
Thirty Under 30 Class of 2025

Numerous awards were given out to the shining lights of the automotive industry. Pictured are the victors in the Thirty-Under-30 awards.

Exhibitors put on such impressive displays that judges must have had a very difficult task picking the best. Pictured is the triumphant Alliance Automotive team, which scooped third place in the Best Customer Engagement Stand category.

▶ Informal talks were given, sharing experiences of what earning a living in the motor vehicle repair trade is all about.

This included recognising younger recruits through the Thirty-Under-30 awards to celebrating rising stars from across the aftermarket, who could well become the trade's future leaders.

Additionally, we should highlight the important work that is being undertaken by the industry charity, BEN. Specifically, its show focus was on mental health and BEN was on hand to help both employees and employers support themselves and each other on this important subject.

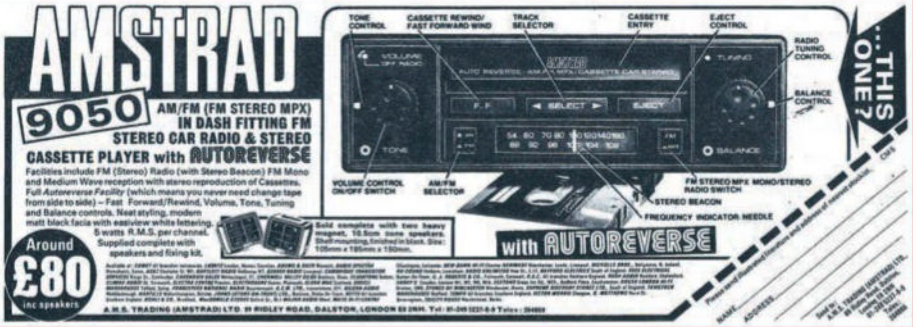
2025's Automechanika was judged to be a roaring success. Interest from attendees and suppliers continues to grow, as the show's remit expands. Described as a 'watershed' by the SMMT, it is unsurprising that almost three-quarters of available space for the next 2027 event has been booked already. Especially if you are thinking of a career in the automotive industry, regardless of your stage of life, this is an event that you must diarise – and, above all, there is no attendance fee.

SUMMER FUN

With the current motoring world going forward in constant leaps and bounds with advanced technology, perhaps a thought as to what breakthroughs there were in the mid-1970's to the keen motorist, judging by the assorted product adverts in motoring magazines back then. John Ward reports.

Stereo radio/cassette player

▶ Possibly with the summer in full swing, what better than having music coming out of a then state-of-the-art stereo radio/cassette player, as back then radios were not standard fittings but something you bought and installed yourself. One such feature packed model was the **Amstrad 9050** from **AMS Trading** of Ridley Road, Dalston, London, that retailed around eighty pounds. The radio also had an auto-reverse cassette player that when one side of the twin-sided tape had finished playing, it then played the other side –a true innovation!



AMSTRAD

9050 AM/FM (FM STEREO MPX) IN DASH FITTING FM STEREO CAR RADIO & STEREO CASSETTE PLAYER with AUTOREVERSE

Facilities include FM (Stereo) Radio (with Stereo Beacon) FM Mono and Medium Wave reception with stereo reproduction of Cassettes. Full *Autoreverse Facility* (which means you never need change tape from side to side) – Fast Forward/Rewind, Volume, Tone, Tuning and Balance controls. Neat styling, modern matt black facia with easiview white lettering. 5 watts R.M.S. per channel. Supplied complete with speakers and fixing kit.

Around £80 inc speakers

Sold complete with two heavy magnet, 10.5cm cone speakers. Shelf mounting, finished in black. Size: 105mm x 185mm x 150mm.

with AUTOREVERSE

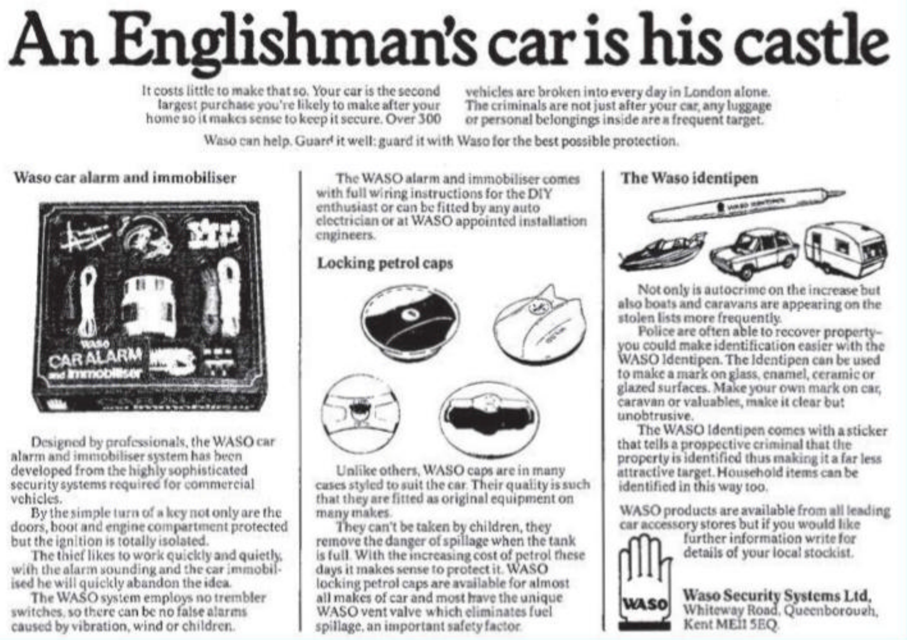
...THIS ONE?

A.M.S. TRADING (AMSTRAD) LTD. [illegible] RIDLEY ROAD, DALSTON, LONDON [illegible]

TONE CONTROL
CASSETTE REWIND/ FAST FORWARD WIND
TRACK SELECTOR
CASSETTE ENTRY
EJECT CONTROL
RADIO TUNING CONTROL
BALANCE CONTROL
VOLUME CONTROL ON/OFF SWITCH
AM/FM SELECTOR
FM STEREO MPX MONO/STEREO RADIO SWITCH
STEREO BEACON
FREQUENCY INDICATOR NEEDLE
NAME
ADDRESS

Car theft protection offered in various forms

▶ Car, or vehicle security, was predominant back then, with **Waso Security Systems Ltd.**, Whiteway Road, Queenborough, Kent, having a half-page advert in assorted motoring-related magazines of the day extolling the ventures of their assorted range of vehicle security products. These ranged from a car alarm with immobiliser, locking petrol filler caps and the Waso Identipen, which seems to be an ultraviolet marking device that came supplied with its own warning stickers that items were security marked, with all these available from the usual motoring outlets or contact the makers direct for details.



An Englishman's car is his castle

It costs little to make that so. Your car is the second largest purchase you're likely to make after your home so it makes sense to keep it secure. Over 300 vehicles are broken into every day in London alone. The criminals are not just after your car, any luggage or personal belongings inside are a frequent target.

Waso can help. Guard it well: guard it with Waso for the best possible protection.

Waso car alarm and immobiliser

Designed by professionals, the WASO car alarm and immobiliser system has been developed from the highly sophisticated security systems required for commercial vehicles.

By the simple turn of a key not only are the doors, boot and engine compartment protected but the ignition is totally isolated.

The thief likes to work quickly and quietly, with the alarm sounding and the car immobilised he will quickly abandon the idea.

The WASO system employs no trembler switches, so there can be no false alarms caused by vibration, wind or children.

The WASO alarm and immobiliser comes with full wiring instructions for the DIY enthusiast or can be fitted by any auto electrician or at WASO appointed installation engineers.

Locking petrol caps

Unlike others, WASO caps are in many cases styled to suit the car. Their quality is such that they are fitted as original equipment on many makes.

They can't be taken by children, they remove the danger of spillage when the tank is full. With the increasing cost of petrol these days it makes sense to protect it. WASO locking petrol caps are available for almost all makes of car and most have the unique WASO vent valve which eliminates fuel spillage, an important safety factor.

The Waso identipen

Not only is autocrime on the increase but also boats and caravans are appearing on the stolen lists more frequently.

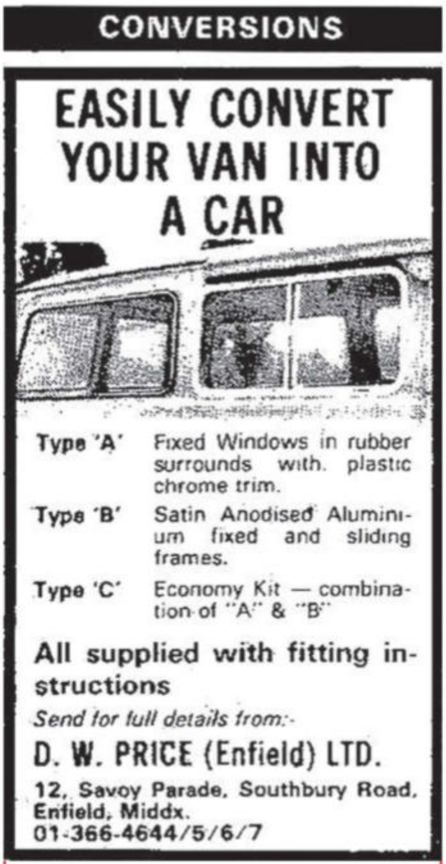
Police are often able to recover property-you could make identification easier with the WASO Identipen. The Identipen can be used to make a mark on glass, enamel, ceramic or glazed surfaces. Make your own mark on car, caravan or valuables, make it clear but unobtrusive.

The WASO Identipen comes with a sticker that tells a prospective criminal that the property is identified thus making it a far less attractive target. Household items can be identified in this way too.

WASO products are available from all leading car accessory stores but if you would like further information write for details of your local stockist.

Waso Security Systems Ltd,
Whiteway Road, Queenborough,
Kent ME11 5EQ.

WASO CAR ALARM and immobiliser
WASO



CONVERSIONS

EASILY CONVERT YOUR VAN INTO A CAR

Type 'A'	Fixed Windows in rubber surrounds with plastic chrome trim.
Type 'B'	Satin Anodised Aluminium fixed and sliding frames.
Type 'C'	Economy Kit — combination of "A" & "B"

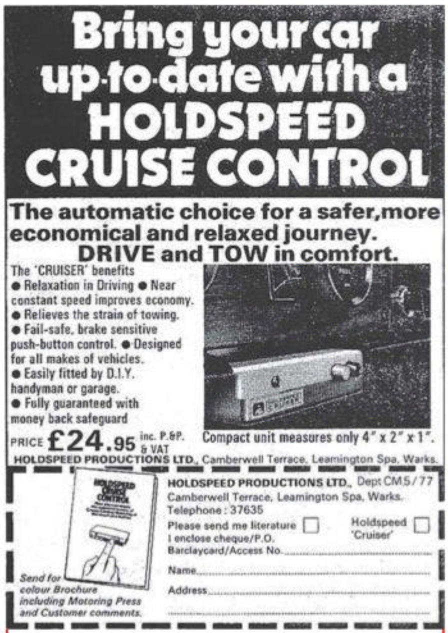
All supplied with fitting instructions

Send for full details from:-

D. W. PRICE (Enfield) LTD.
12, Savoy Parade, Southbury Road,
Enfield, Middx.
01-366-4644/5/6/7

Convert your motor

▶ Back in that era there was quite a market in converting vans into cars or rather a form of estate type vehicle. By adding replacement side windows, cutting out the rear side panels then adding assorted kits that contained the glass and framework and to a degree these were quite successful, although they basically looked like DIY kits regardless. One supplier was **D W Price (Enfield) Ltd.**, Savoy Parade, Southbury Road, Enfield, quoted three different sizes or types being available, although no prices are quoted. You applied for details by post but reassuringly all were supplied with fitting instructions. One of our neighbour's bought such a kit but somehow misjudged the cutting template and the hole was the same size as the whole unit but luckily he only cut one panel at a time – the 'repair' was quite something to see.



Bring your car up-to-date with a HOLDSPEED CRUISE CONTROL

The automatic choice for a safer, more economical and relaxed journey.
DRIVE and TOW in comfort.

The 'CRUISER' benefits
- Relaxation in Driving
- Near constant speed improves economy.
- Relieves the strain of towing.
- Fail-safe, brake sensitive push-button control.
- Designed for all makes of vehicles.
- Easily fitted by D.I.Y. handyman or garage.
- Fully guaranteed with money back safeguard

PRICE £24.95 inc. P.&P. & VAT

Compact unit measures only 4" x 2" x 1".

HOLDSPEED PRODUCTIONS LTD., Camberwell Terrace, Leamington Spa, Warks.

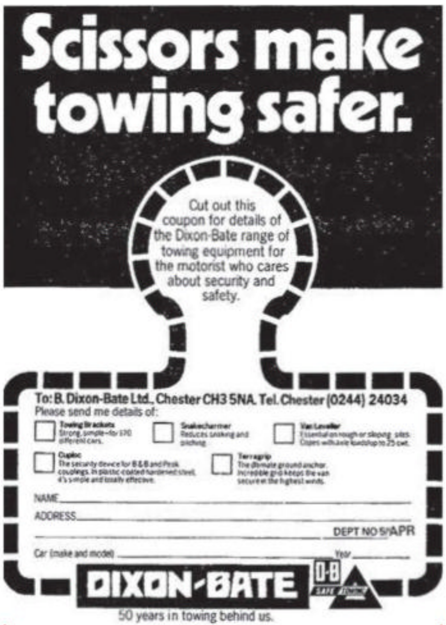
HOLDSPEED PRODUCTIONS LTD., Dept CM5/77
Camberwell Terrace, Leamington Spa, Warks.
Telephone: 37635

Please send me literature ☐ Holdspeed 'Cruiser' ☐
I enclose cheque/P.O.
Barclaycard/Access No. ....
Name ....
Address ....

Send for colour Brochure including Motoring Press and Customer comments.

1970s cruise control

▶ One real innovation was the **Holdspeed Cruise Control** from **Holdspeed Productions Ltd.**, Camberwell Terrace, Leamington Spa, that offered a DIY cruise control device for £24.95 including VAT and postage. A friend's father bought a Ford Granada second-hand at auction with this, from memory, device fitted, but when asked what it did, he said he was unsure so 'best to leave it alone as the car runs OK'!



Scissors make towing safer.

Cut out this coupon for details of the Dixon-Bate range of towing equipment for the motorist who cares about security and safety.

To: B. Dixon-Bate Ltd., Chester CH3 5NA. Tel. Chester (0244) 24034
Please send me details of:

☐ **Towing Brackets** Strong, simple—for 170 different cars.
☐ **Snakecharmer** Reduces snaking and pitching.
☐ **Van Leveller** Essential on rough or sloping sites. Copes with axle loads up to 25 cwt.
☐ **Cuplok** The security device for B & B and Peak couplings. In plastic-coated hardened steel, it's simple and totally effective.
☐ **Terragrip** The ultimate ground anchor. Incredible grip keeps the van secure in the highest winds.

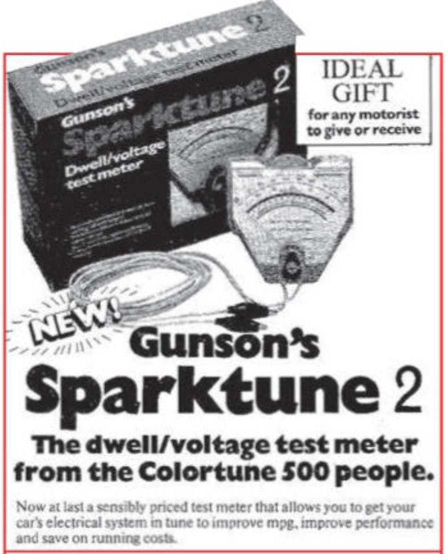
NAME ....
ADDRESS ....
DEPT NO 5/APR
Car (make and model) .... Year ....

DIXON-BATE

50 years in towing behind us.

Tow on show

▶ One original and eye-catching advert for towing equipment was from **Dixon-Bate Ltd.**, in Chester, that was in the shape of a towball hitch that said, 'Scissors make towing safer', as the idea being you filled in the coupon to send to them, requiring information on their assorted products and then cut it out, hence the scissors, so quite a novel advert among the other motoring-related adverts.



IDEAL GIFT for any motorist to give or receive

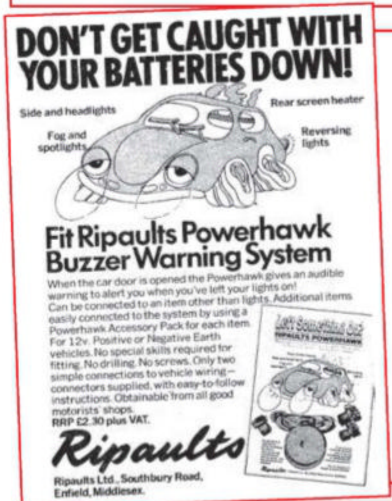
NEW! Gunson's Sparktune 2

The dwell/voltage test meter from the Colortune 500 people.

Now at last a sensibly priced test meter that allows you to get your car's electrical system in tune to improve mpg, improve performance and save on running costs.

Gunson tuning

▶ I must admit I bought a **Gunson Sparktune 2** way in the late 1970's as it was a modestly priced hand-held dwell and voltage test meter that was easy to use and made me very popular with friends and neighbours as word got round I had got one, hence folk arriving wanting to borrow it. It was priced at £8.90 plus the VAT and was marketed by **Gunson's Colourplugs Ltd.**, Royal Mint Street, London – and I also had one of their almost legendary Colortune ('blue liquid spark plugs') engine tuning devices.



DON'T GET CAUGHT WITH YOUR BATTERIES DOWN!

Side and headlights
Rear screen heater
Fog and spotlights
Reversing lights

Fit Ripaults Powerhawk Buzzer Warning System

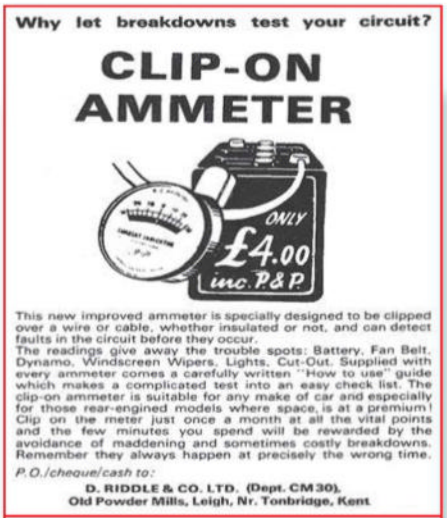
When the car door is opened the Powerhawk gives an audible warning to alert you when you've left your lights on! Can be connected to an item other than lights. Additional items easily connected to the system by using a Powerhawk Accessory Pack for each item. For 12v. Positive or Negative Earth vehicles. No special skills required for fitting. No drilling. No screws. Only two simple connections to vehicle wiring—connectors supplied, with easy-to-follow instructions. Obtainable from all good motorists' shops.
RRP £2.30 plus VAT.

Ripaults

Ripaults Ltd., Southbury Road,
Enfield, Middlesex.

Buzzer warning system

▶ Technology was moving on, as the risk of having a flat battery might be cured by the **Ripaults Powerhawk Buzzer Warning System** as manufactured by **Ripaults Ltd.**, of Southbury Road, Enfield, Middlesex, that was available from car accessory or motoring outlets for £2.30 plus VAT. It was simple to fit apparently with only two wiring connections but once fitted, it sounded a buzzer to let you know the headlights were still on when you opened your vehicle door – we take this for granted nowadays but in 1977 it was an innovation for its time.



Why let breakdowns test your circuit?

CLIP-ON AMMETER

ONLY £4.00 inc. P.&P.

This new improved ammeter is specially designed to be clipped over a wire or cable, whether insulated or not, and can detect faults in the circuit before they occur.
The readings give away the trouble spots: Battery, Fan Belt, Dynamo, Windscreen Wipers, Lights, Cut-Out. Supplied with every ammeter comes a carefully written "How to use" guide which makes a complicated test into an easy check list. The clip-on ammeter is suitable for any make of car and especially for those rear-engined models where space, is at a premium! Clip on the meter just once a month at all the vital points and the few minutes you spend will be rewarded by the avoidance of maddening and sometimes costly breakdowns. Remember they always happen at precisely the wrong time.

P.O./cheque/cash to:

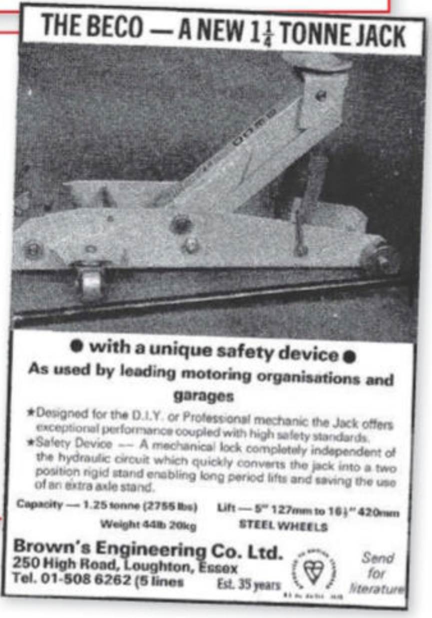
D. RIDDLE & CO. LTD. (Dept. CM30),
Old Powder Mills, Leigh, Nr. Tonbridge, Kent

Improved ammeter

▶ For the motorist without an instrument dial loaded dashboard, help was at hand with **The Clip-On Ammeter** that did exactly as the name implied as you could clipped it onto the wiring to find assorted faults via the supplied 'How to' written guide. This handy device was available direct by mail order from **D Riddle & Co.**, Old Powder Mills, Leigh, Tonbridge, Kent, for £4 including postage.

New 1¼ tonne jack

▶ One differently designed trolley type jack was the **Beco 1¼ ton Jack** from **Brown's Engineering Ltd.**, High Street, Loughton, Essex, that was innovative in that it had a built-in arm so that once the right height was gained, the arm was placed into position. Although the photo does not give too much detail as to how, which acted as a support brace but didn't rely on the jack hydraulic system alone. No prices are quoted as it was a case of writing for details. The principle is fairly obvious, but why such a product is not about nowadays is slightly baffling from the safety aspect – or is there one?



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● **with a unique safety device** ●

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★Designed for the D.I.Y. or Professional mechanic the Jack offers exceptional performance coupled with high safety standards.
★Safety Device — A mechanical lock completely independent of the hydraulic circuit which quickly converts the jack into a two position rigid stand enabling long period lifts and saving the use of an extra axle stand.

Capacity — 1.25 tonne (2756 lbs)
Lift — 5" 127mm to 16½" 420mm
Weight 44lb 20kg
STEEL WHEELS

Brown's Engineering Co. Ltd.
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Est. 35 years

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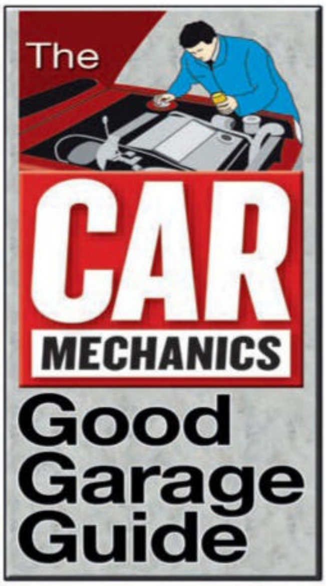


This listing is published every **THREE** months and will next appear in our **November 2025** issue. We welcome further nominations (from satisfied customers only please, no self-nominations) of businesses to be included, so that we can make this listing as useful as possible to readers throughout Britain and Ireland.
Please write to:
***Car Mechanics* Good Garage Guide, Kelsey Media, The Granary, Yalding Hill, Yalding, Kent ME18 6AL.** Or email:
martyn.knowles@kelsey.co.uk

AVON

Lockleaze Service Station, Lockleaze Road, Bristol BS7 9RU.

BERKSHIRE

Mike Farina Auto Services, 21 Sedgewell Road, Sonning Common, nr Reading, Berks RG4 9TA. Tel: 0118 972 4036. *Servicing, repairs.*

BUCKINGHAMSHIRE

Stokenchurch Service Centre, Wycombe Rd, Stokenchurch, Bucks HP14 3RR. Tel: 01494 483355. *Servicing, repairs, tuning, MOTs, welding, exhausts, batteries.*

M D Autocare, 54/55 Rabans Close, Aylesbury, Buckinghamshire HP19 8RS. **www.md-autocare.co.uk**

CAMBRIDGESHIRE

D.L.M. Autos, 63a Orchard Road, Great Shelford, Cambs CB22 5AA. *MOTs, servicing/repairs on modern & older cars.*

G Nice and Sons Ltd, 3 Chapel Street, Waterbeach, Cambs CB25 9HR. Tel: 01223 860241. *Isuzu specialist, MOT testing, aircon specialists.*

Kings of Witcham, The Slade, Witcham, nr Ely, Cambs CB6 2LA. Tel: 01353 778403, email: info@kingsofwitcham.co.uk. *Independent Volvo specialist since 1996.*

Saabmaster Garage Services, Unit 7, Robert Davies Court, Nuffield Road, Cambridge CB4 1TP. Tel: 01223 420055. *Independent Saab specialists.*

Swift Car Care, 145-147 St Pauls Road, Peterborough. Tel: 01733 897080.

VW Technics, Unit 10, Highgate Farm, Over Road, Willingham, Cambridge CB24 5EU. **vwspecialistcambridge.co.uk**

CHESHIRE

Andy Stockton Autocare Ltd, Unit 26, Heron Business Park, Tan House Lane, Widnes WA8 0SW. Tel: 0151 420 2838. **asautocare.co.uk** *Vauxhall specialist.*

CLEVELAND

Ron Payne & Son, Baltic Street, Hartlepool TS25 1PS. Tel: 01429 273646.

CORNWALL

Dale Brett Autos, Gilston Road, Saltash, Cornwall PL12 6TW. Tel: 01752 849448. *Family owned and run. 10/10 everytime.*

Ferris Garage Ltd, Truro TR3 6RE. Tel: 01872 862218.

M Clark Motors, Polperro Road, West Looe PL13 2QP. Tel: 01503 265511. *MOTs, servicing, welding, tracking, bodywork, exhausts, batteries.*

CUMBRIA

Cleator Moor Auto & Body Repairs Ltd, Ennerdale Road, Cleator Moor, Cumbria, CA25 5LD. Tel: 01946 811800. *Service is brilliant and the mechanics very knowledgeable.*

Riverside Garage, Holmrook, Cumbria CA19 1UH. Tel: 01946 724228. *Friendly helpful and professional service.*

Wheatsheaf Garage, Low Road, Brigham, Cockermouth CA13 0XH. Tel: 01900 825946. *Excellent service. Classics welcome, especially Minor & MGB.*

DERBYSHIRE

The Service Garage Ltd, Engineering Services, 51 Derby Road, Borrowash, Derby DE72 3HA. Tel: 01332 663982 or 677131.

Walgrove Garage Ltd, Walgrove Road, Brampton, Chesterfield, Derbyshire S40 2DS. Tel: 01246 278181. *French & VAG specialists. MOTs, tyres and welding.*

Walkers Motors Servicing & Repairs, 9 Platt Street, Padfield, Glossop SK13 1EB.

DEVON

Racecourse Garage, Babbage Road, Totnes Industrial Estate, Totnes, Devon TQ9 5JA. Tel: 01803 862297. *Offers excellent service and competitive rates.*

Tuned Auto Repairs, Newcourt Barton, Clyst Road, Topsham, Exeter EX3 0DB. *Excellent customer service at cheap rates.*

DURHAM

Skipbridge Garage, Hurworth Moor, Darlington, County Durham DL2 1QL. Tel: 01325 720498.

ESSEX

Bennetts BMW Specialists, Unit 1, Haltgate House, Hullbridge Road, South Woodham Ferrers, Chelmsford, Essex CM3 5NG. Tel: 01245 328601, **www.bennettsbmw.co.uk** *BMW specialists, also all-makes repairs.*

The Bodyshop, 31-37 Tomswood Hill, Barkingside, Essex IG6 2HL. Tel: 020 8500 9228 **bodyshop.uk.com**

D & A Autos, Unit 1A, Pools Lane, Highwood, Chelmsford, Essex CM1 3QL. Tel: 01245 248317.

Frank Shaikley and Sons, Hawkins Road, The Hythe, Colchester, Essex CO2 8JY. Tel: 01206 796657.

Halfway Garage, behind Frinton Gate Motors, Colchester Road, Tendring, Essex CO16 9AA. Tel: 01255 831285. *Service, repairs, MOTs incl motorbikes.*

Motorvation 2000, Unit 13 Stondon Road, Hallsford Bridge Industrial Estate, Ongar, Essex CM5 9RB. Tel: 01277 364241. *Engine rebuilds, MOT, servicing, electrics.*

Oakdene Autos, Cranes Close Basildon, Essex SS14 3JB. Tel: 01268 520537. **www.oakdeneautos.co.uk** *Bodywork, welding, MOT & servicing work.*

Pristine Bodyworks/RR Automotive, Scaldhurst Farm, Larkhill Road, Ashington, Essex SS4 3RU. Tel: 01702 257177. *Family run – one brother handles mechanical work, the other bodywork.*

GLOUCESTERSHIRE

Stonehouse Exhaust, Unit 1, Orchard Place, Stonehouse, Gloucestershire. Tel: 01453 822971. *Excellent garage. Good old-fashioned service!*

HAMPSHIRE

Keylink Systems Ltd, 15/16 The Calvert Centre, Woodmancott, Winchester SO21 3BN. Tel: 01256 379150. *Mercedes/BMW specialists but will take care of anything.*

SJB Autotech, Unit 3, Beresford Centre, Wade Road, Basingstoke RG24 8FA. Tel: 01256 477 411. **sjbautotech.co.uk** *Jim, the owner, is extremely experienced with the VAG range.*

Mendem Motors Ltd, Unit 4, Stacey Industrial Park, Silchester Road, Tadley RG26 3PY. Tel: 0118 970 2222. **mendemmotors.co.uk**

Wes & Co, Shootash Garage, Salisbury Road, Romsey, Hants SO51 6GA. Tel: 01794 515003. *MOT station, servicing.*

HEREFORDSHIRE

DC Rogers Auto Repairs, Unit 11, Beech Business Park, Tillington Road, Hereford HR4 9QJ. Tel: 01432 264200.

HERTFORDSHIRE

Broxbourne MOT and Motorist, Unit 1, Bridge Works, Nazing New Road, Broxbourne, Herts EN10 6SG.

KENT

Bexley Lane Garage, 33-47 Bexley Lane, Crayford DA1 4DD. Tel: 01322 527279 **bexleylanegarage.co.uk** *Lockheed Authorised Brake Safety Centre, MOTs, servicing.*

Chelsfield Motor Works, Court Lodge Farm, Warren Road, Orpington BR6 6ER. Tel: 01689 890689. *Mechanical repairs, MOTs, bodywork, aircon, diagnostics.*

Hartley Garage Services Ltd, Ash Road, Longfield DA3 8EL. Tel: 01474 706501. *All usual garage services plus MOTs/aircon.*

Ivydene Garage Ltd, Unit 99, Ellingham Way, Ellingham Ind. Est., Ashford TN23 6LZ. Tel: 01233 636081. *Mechanical repairs, servicing all makes, MOTs, aircon, Bosch diagnostics.*

LANCASHIRE

Mick's Garage, Unit 2A Old Station Yard, Kirkby Lonsdale LA6 2HP. Tel: 01524 237785. **https://micksgarage-ap.co.uk** *Proprietor Mick Gudgeon is a time-served MB tech but also works on all other makes. MOT station up to Class 7 with a 6.5m bay.*

LEICESTERSHIRE & RUTLAND

Broad Street Garage, The Old Forge, Brook St, Enderby, Leicester LE19 4ND. Tel: 0116 286 1416.

L&H Exhausts MOT & Service Centre, 4 Charlotte Street, Melton Mowbray, Leics LE13 1NA. Tel: 01664 562684. **lhexhaustsmotcentre.co.uk** *Very good independent garage.*

Tarsel Motors Ltd, 173 Church Hill Road, Thurmaston, Leicester LE4 8DH. Tel: 0116 693333.

J. T. Tilley and Son, 3 Lutterworth Road, Burbage, Hinckley, Leics LE10 2DJ. Tel: 01455 239303.

LINCOLNSHIRE

Corten Miller Performance Centre, Friskney Eaudykes, Skegness, Lincs. *Very knowledgeable highly-skilled staff.*

Derek Chapman Motor Services, 13 High Street, Alford, Lincolnshire. Tel: 01507 462571. *An excellent and friendly garage and bodyshop.*

G Harniess (Louth) Ltd, Bolingbroke Road, Fairfield Industrial Estate, Louth LN11 0WA. Tel: 01507 603341. **gharniess-louth.co.uk**

Huttoft Service Station, Mumby Road, Huttoft, Lincs LN13 9RF. Tel: 01507 490283. *Village garage with all usual repair facilities plus LPG stockists.*

W H Brand and Son, Whaplode Drove, nr Spalding, Lincs. Tel: 01406 330265. *Daewoo/Chevrolet franchise and independent MG Rover specialists.*

LONDON (GREATER)

Barnet Service & Tuning Centre, 1 Motor Way, Margaret Road, New Barnet, Herts EN4 8DW. Tel: 020 8441 6667. **www.scimitarmotorservices.co.uk** *All usual garage services plus MOT testing.*

MANCHESTER (GREATER)

Phoenix Close Honda, Unit 208 Phoenix Close Industrial Estate, Heywood OL10 2JG. Tel: 01706 366500. *Proprietor Chris assisted by Phil are both Honda trained. Mechanical & diagnostic work. Wouldn't take our CR-V anywhere else.*

MERSEYSIDE

Village Auto Repairs, 6a Greenes Road, Whiston, Prescot, Merseyside L35 3RF. Tel: 0151 426 0999. *Servicing and repair of cars & light commercials. Also a Class 4 MOT testing.*

NORFOLK

Bragg of Briston, 23A Fakenham Road, Briston, Melton Constable, Norfolk NR24 2HL. Tel 01263 860554. *Peugeot/Citroën specialist but now covering all makes.*

Herring and Palmer, Hewett Yard, Hall Road, Norwich. Tel: 01603 666585. *BMW specialists, all makes catered for.*

Threeways Garage, Watton Road, Shipham, Norfolk IP25 7PE. Tel: 01362 820430. *Independent Citroën specialist, also repairs/services other makes. MOTs.*

S & R Motors, Sunset Lodge Industrial Units, St. Germans, Kings Lynn. Tel: 01553 617696 or 07788 268121. *Run by Steve Smith. Service is excellent.*

Stone Chips Ltd, 12 Garden Street, Norwich NR1 1QU. *Minor paintwork repairs, bumpers, etc. Valeting, interior repairs, alloy refurbishment.*

NORTHAMPTONSHIRE

Rob Price Automotive Services, 146 Northampton Road, Broughton, Kettering, Northants NN14 1NS. Tel: 01536 790901.

NORTHUMBERLAND

JT Auto Services, The Old Works, Red Row, Morpeth, Northumberland NE61 5AU. Tel: 01670 761711. *Repairs, servicing.*

NOTTS

PVS (Professional Vehicle Servicing), Glaisdale Drive, Nottingham NG8 4GY. Tel: 0115 928 3333. *Repairs, servicing, reasonable prices, helpful staff.*

Wright Engineering Co Ltd, 332 Colwick Road, Nottingham NG2 4BG. Tel: 0115 950 2284. **wright-engineers.co.uk** *Automotive services including milling, turning, grinding, and fabricating.*

OXFORDSHIRE

Oxford Autogas, Tiddington Garage, Oxford Road, Tiddington. Oxon. OX9 2LH. Tel: 01844 279588. oxfordautogas.com *LPG installation and servicing. MOT, service and repairs.*

SHROPSHIRE

Bridgnorth Motor Services, Station Lane, Hollybush Road, Bridgnorth, Shropshire WV16 5DP. Tel: 01746 762562 or 07708 167346. *Mark is an ex-Ford mechanic and seems very experienced.*

SOMERSET

Hatley Garage, 86 Kewstoke Road, Kewstoke, Weston-super-Mare, North Somerset BS22 9YH. Tel: 01934 622495. *Specialising in classic Mini's.*

N S Autos, Prowles Cross, Yeovil, Somerset BA22 9RG. Tel: 01935 872891. nsautos.co.uk

STAFFORDSHIRE

Midland VW, 21 Conduit Road, Norton Canes, Cannock, Staffs WS11 9TJ. Tel: 01543 495700. midlandvw.com

Snows Garage (Hanley) Ltd, 706 Leek Road, Hanley, Stoke-on-Trent, Staffs ST1 4NP. Tel: 01782 215544.

Squire Automotive, Unit 2A Zone 2 Ring Road, Burntwood Business Park, Burntwood, Staffs WS7 3JQ. Tel: 01543 672247. squireautomotive.co.uk

SUFFOLK

Barrett-Lee Ltd, 4 Byford Road, Sudbury, Suffolk CO10 2YG. Tel: 01787 468900.

DN Autos Mobile Mechanic, based Saxmundham, Suffolk – but travels. Tel: 07895 078447. *Trustworthy bloke, reasonable prices. My family's go-to mechanic.*

SUSSEX

Coles Automotive, Browns Meadow, Edburton Road, Edburton, Henfield, West Sussex BN5 9LN. Tel: 01273 857520. colesautomotive.co.uk *Land Rover ralliers.*

Cradle Hill Motors, Unit 16, Cradle Hill Ind Est, Seaford, East Sussex. Tel: 01323 890737.

Rew Auto Services, Unit 13, Eastmead Industrial Estate, Lavant, Chichester, West Sussex PO18 0DB. Tel: 01243 839520.

Vasstechnik, Unit 2, Potts Marsh Est., Eastbourne Road, Westham, Pevensey, East Sussex BN24 5NH. Tel: 01323 438754. vasstechnik.co.uk *Servicing/repairs to VAG and MG/Rover.*

SURREY

MCM, Station Lane, Milford, Surrey GU8 5AD. Tel: 01483 424815. *VW/Audi, BMW, Mercedes – all quality car specialists.*

Elmwood Vehicles Ltd, 278 Kingston Road, Ewell, Surrey KT19 0SH. Tel: 0208 394 2847 carservicerepairssurrey.co.uk

TYNE & WEAR

Gavin Reed Ltd, Sunniside Garage, Front Street, Sunniside, Newcastle-Upon-Tyne NE16 5EE. Tel: 0191 488 7298.

Scotts Bank Motor Services, Scotts Bank, Southwick, Sunderland. Tel: 0191 549 7500. *Volvo-trained.*

WEST MIDLANDS

Cottage Garage, Brandon Way, West Bromwich B70 9PW. Tel: 0121 525 4413.

GW Motors, 172 Sockfield Road, Acocks Green, Birmingham B27 6AU. Tel: 0121 706 2327 or 0121 706 4770. *Family-owned and "friendly, helpful and no bullshit."*

WILTSHIRE

FJ Chalke Ltd, The Talbot Garage, Mere, near Warminster, Wiltshire BA12 6HE. Tel: 01747 860244 www.fjchalke.co.uk. *Kia agent, before that Austin then Rover.*

Melksham CarCare Centre, Bath Road, Melksham SN12 8DB. Tel: 01225 703014.

WORCESTERSHIRE

RK Services, Lower Leys, Evesham, Worcestershire WR11 3AB. Tel: 01386 48935. rkservices.com

YORKSHIRE

Hargreaves Jeep Specialists and MOT Centre, Bradford Road, Sandbeds, Keighley, West Yorks BD20 5LY. Tel: 01274 569262. hargreavesgarage.co.uk

Horbury Garage, 35 Westfield Road, Horbury, Wakefield WF4 6HS. Tel: 01924 265283.

Pure Car Mechanics, Westgate Carr Business Park, Westgate Carr Road, Pickering, North Yorkshire YO18 8LX. Tel: 01751 475794. purecarmechanics.co.uk *The garage is female-friendly.*

RTN Auto Services, 11 Waggon's Way, Stainforth, Doncaster, South Yorks. Tel: 01302 351167. *Peugeot/Citroën specialist.*

W Sykes & Son Ltd, Lower Wortley, Leeds LS12 6AB. Tel: 0113 263 9388. *MOTs, servicing and repairs. Small family garage.*

Victoria Motors, Victoria Street, Stocksbridge, Sheffield S36 1GY. victoria-motors-stocksbridge.co.uk

Yorkshire Vehicles 24-7, Unit 5 Sunshine Mills, Leeds LS12 3HT. Tel: 0113 318 5259. yorkshirevehicles24-7.co.uk

NORTHERN IRELAND

T.F. Cars (Tommy Fegan), Motor Engineers, 35-39 Parkmount Road, Antrim Rd, Belfast BT15 4EQ. Tel: 028 9037 1868. *A father and son outfit, doing mechanical and MOT work at reasonable rates.*

McKay Motor Works, 616a Antrim Road, Newtownabbey BT36 4RF. Tel: 07787 806597. *Toyota Master Technician.*

SCOTLAND

Greenend Motors, 20 Sunnybank Terrace, Lower London Road, Edinburgh EH7 5TW. Tel: 0131 661 4825.

Lewiston Garage, J A Menzies & Sons Ltd., Lewiston, Drumnadrochit, Inverness IV63 6UL. Tel: 01456 450212. *Good village garage, MOTs. Excellent and helpful.*

Lothian Motors, 68 Lothian Street, Bonnyrigg, Midlothian EH19 3AQ. Tel: 0131 663 1076. *Family-run, electronic and aircon repairs, servicing and MOT.*

Sutherland Arms Garage, Victoria Road, Brora, Sutherland KW9 6QN. Tel: 01408 621721. *Vauxhall specialist, MOTs, aircon and servicing to all makes.*

The Garage (Wishaw) Ltd, 70A Elison Court, Motherwell, Scotland ML1 2DN. Tel: 01698 265303. *Japanese performance specialist, MOTs. Excellent diagnostics.*

WALES

MB Motors, Cowbridge Road, Brynsadler, Pontyclun, Mid Glamorgan CF72 9BT. Tel: 01443 229522.

The Olde Pounde Garage, Penperlleni near Pontypool. Tel: 01873 880312. *MOTs, plus general repairs/maintenance.*

Three Arches Services Ltd, Heathwood Road, Cardiff CF14 4HT. Tel: 02920 752101.

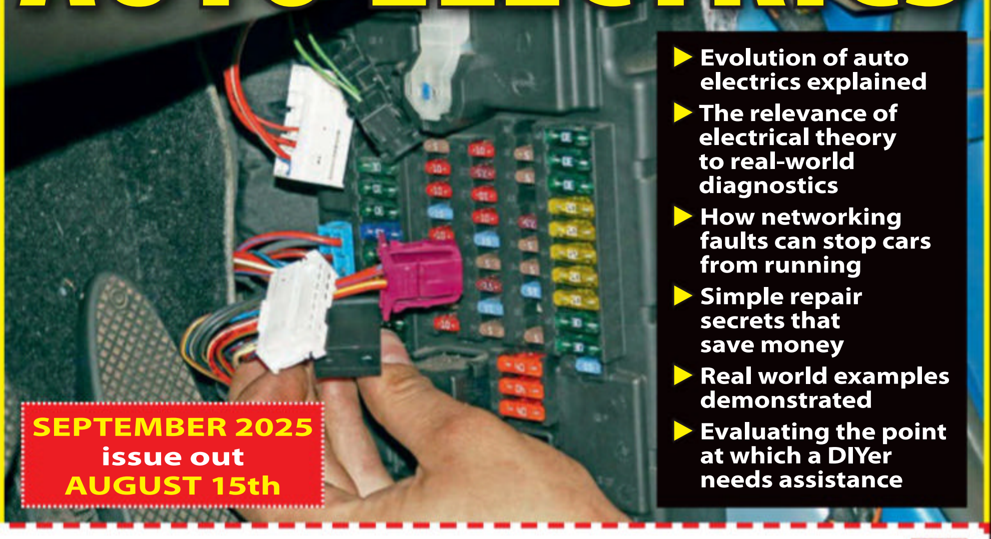
AJ Autos, 2a Gaskell Street, Newport, Gwent NP19 0GH. Tel: 01633 250513.

IRELAND

Harkin's Garage, Gleneely, nr Carndonagh, Co Donegal, Ireland.

NEXT MONTH

AUTO ELECTRICS



- Evolution of auto electrics explained
- The relevance of electrical theory to real-world diagnostics
- How networking faults can stop cars from running
- Simple repair secrets that save money
- Real world examples demonstrated
- Evaluating the point at which a DIYer needs assistance

SEPTEMBER 2025 issue out AUGUST 15th

Peugeot 2008 REAR BRAKES (Pt2)

- BUYING A MINI COUPE & ROADSTER
- NISSAN MICRA 1.0 DIAGNOSTICS
- THE BIG EV DEBATE
- FITTING A TOWBAR GUIDELINES

BMW 3-Series Compact PROJECT

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Our Cars

Andrew Everett

Special Contributor

Germany & back

Andrew drove his 1994 Compact back to the Munich factory on its 30th birthday – here it is at BMW Classic, looking quite at home.

In the May 2025 issue, I mentioned the top-end overhaul of the green 318Ti that I took back to the BMW factory for its birthday on September 30th, 2024. On my way back home after dropping off my co-pilot I was about five miles from home, and I just felt it drop power. Nothing too bad but it didn't get any better until a while later when it really did start to run on three. Righto then. Plugs and leads were checked, though I noticed an uneven crank – compression down. I had the car transported to my workshop and had the head off in about two and a bit hours. There it was – a burned exhaust valve on number three.

I could have fixed this myself, but I don't have a valve spring compressor – plus with the head off it made sense to give it a light skim and recut the other valve seats. I had the head hot tanked as well and the £168 bill from Sheffield Engine Services covered this, as well as supply a new valve and replace the stem seals.

With this being done, I ordered some new febi bits – head bolts, head gasket, front head to timing cover profile gasket, exhaust manifold gaskets and so on. With the head off, I also replaced the plastic coolant tube on the side of the block and this I bought from Sytner BMW because I know that they fit perfectly and at £14 it's just a no brainer.

Come the day, come the rebuild. A cylinder-head is bloody heavy when you're leaning over a front wing but despite the exhaust manifold being a fiddle to refit, it was running again four hours later. 500 miles on, it's fine and does zip along nicely.

IN ANDREW'S GARAGE

1989 730i I'm thinking of changing the V5 from 'Private Light Goods' to 'Ornament'. Time for another MOT test soon.

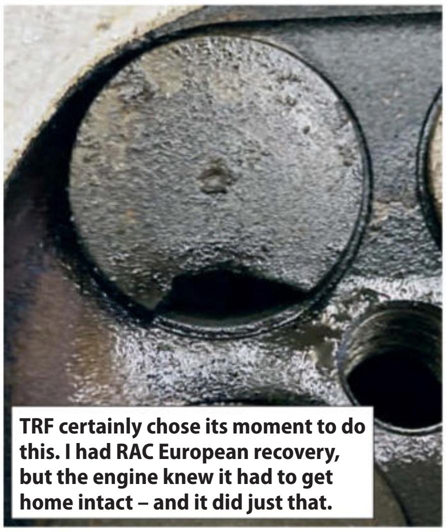
1994 318Ti She's going well at the moment, and some recent improvements haven't cost much money.

1998 316i Compact A £300 Mathewson's purchase – rusty front wings, no MOT and more besides but I still think it's worth saving.

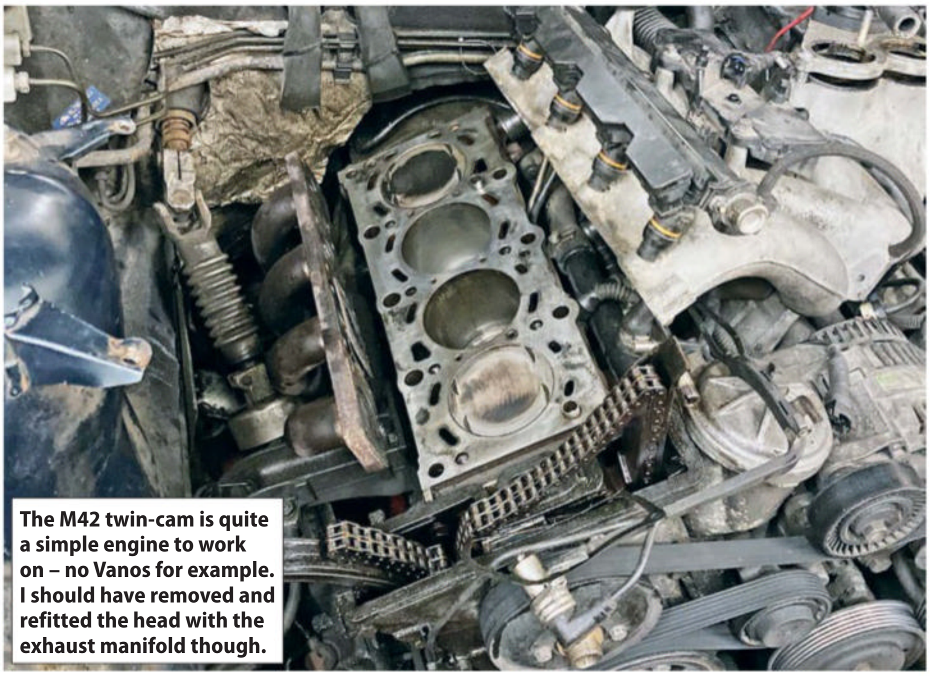
2005 118d A light scratch on the side from an errant Audi saw it written off in January – I kept the car, took the £900 payout and polished the scratch out.

Now, another job I wanted to do was fit the correct 1991-1996 front grille 'nosecone' panel to replace the incorrect later one fitted. The kidney grilles are fatter on the later cars and of course, the bolt on grille panel is pressed differently. I had a perfect nearly new one in stock, but could I really be bothered? Well no – until I needed a good facelift panel for my latest project. More in a minute...

Matt at Body Motor Works in Clay Cross, Chesterfield, painted my correct early panel Boston green and I had it fitted in a couple of hours. I also modified a pair of the correct 91-96 side wing repeaters to really make it look correct.



TRF certainly chose its moment to do this. I had RAC European recovery, but the engine knew it had to get home intact – and it did just that.



The M42 twin-cam is quite a simple engine to work on – no Vanos for example. I should have removed and refitted the head with the exhaust manifold though.

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That's better! All the exhaust valve seats were in need of recutting so hopefully it's good for a few more miles.

The wing holes are bigger on early wings and I'm not chopping into those.

Lastly on this car, I got around to replacing the broken heater/radio face panel. Some beast had broken it in the distant past levering out some awful radio (no, not me). Looking online at second-hand panels they weren't any good, so I looked at new panels – SEVENTY FIVE QUID! Not on your life.

But I took my own advice and checked with BMW – £40 is more like it. I ordered that and spent a fiddly hour or so fitting it, whereon I discovered a coolant drip from where the heater pipe goes into the matrix. I rang Sytners again and whilst new O-rings are available, they come in a pack of ten at £18. However, they did a parts search and Sandal BMW Wakefield had two in stock and posted them. £3.96 the pair and no postal charge which is good.

0:00
TONE
MODE
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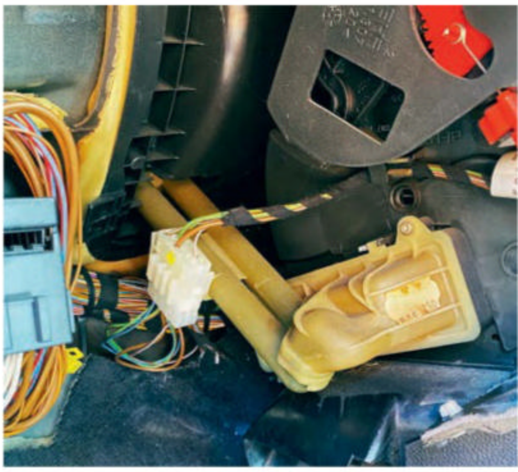
BUSINESS RDS

That's £40 and an hour of fiddling well spent – as well as fitting this lovely new panel, I replaced the dead bulb that lights up the heater controls.

New project car

Of course, it's an old BMW and it's a 1998 S-plate 316i Compact auto bought from Mathewsons Classic auction in March. As you read this, the majority of the restoration work should be done. Tune in next issue to get the low down on this latest folly. It has problems but it's a low owner full history car with a very good interior, aircon, original radio and so on. Oh, and it was £300. I can't help myself.

Finally – the BMW 118d. It's been going very well but got sideswiped by an Audi in December. Long story short, it was written off due to little more than an exchange of paint and I took the £900 payout meaning it's now a free car. I spent an hour with 2500-grit, 3M compound and a polishing mop and you can't see any damage at all. I'll take that as a win!



A tiny coolant drip at the heater pipe to matrix joint was old, flattened O-rings – these cost under £4 from BMW and took an hour to fit.

It only took me eight years, but now M860 TRF has the correct early grille nosecone panel to take the skinny recessed grilles – and the correct side repeaters.

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BLUE PRINT

Our Cars

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Former Editor

It's that old devil called rust again...

As I've mentioned before in *Car Mechanics*, March and April are the Simpson fleet's MOT months, with all four of my cars that still require testing being due. The Volvo 240 is currently off the road as it's a project for *CM*'s sister magazine *Classics World*, but that still leaves my daughter Katie's 2013 VW Up!, the 2014 Kia Sorento family wagon and my 2011 Volvo C70 needing testing. The VW and Kia went straight through, needing no more than the usual lights and levels checks beforehand.

The C70, however, has been a bit more problematical. First, a couple of weeks before the test was due, I heard a nasty cracking sound from the nearside rear, followed by a constant knocking sound. Diagnosing this didn't take long; a glance inside the nearside rear wheelarch revealed a broken top shock absorber mount. How common this is I don't know – my car spent much of its life in Scotland, and as a result has a fair bit of surface rust underneath, and the issue here seemed somewhat corrosion-inspired...

Volvo C70 at the MOT station, but getting it ready for this appointment involved a fair bit of work first.

So, a new mount was duly ordered, and the car driven on to the hoist in my new-to-me workshop facility, for the necessary repairs. Then, as I removed the rear wheel for access, what was going to be a quick hour's job turned into something rather larger. One of the wheel-studs sheared right off. Two of the others also had severely rusted and somewhat mangled threads. All very, very irritating to put it mildly.

Furthermore, it seems that C70 wheel studs can't be bought separately; at least, I couldn't find a source. So, although it typifies the sort of waste that I absolutely hate, there was no option but to get a complete new rear wheel bearing assembly, courtesy of febi bilstein. Fitting this wasn't especially straightforward either, as the bearing attached to the rear subframe/crossmember by means of four Torx-headed bolts, all of which were far too corroded to take a Torx bit. So, there was no option but to attack the housing from the other side using a

IN PETER'S GARAGE

1949 Riley RMB Ex-Nick Baldwin, bought May 2024 in good running order.

1955 MG Magnette ZA Bought 2022, renovation nearly finished.

1958 Hillman Minx Owned since 1991 – show car.

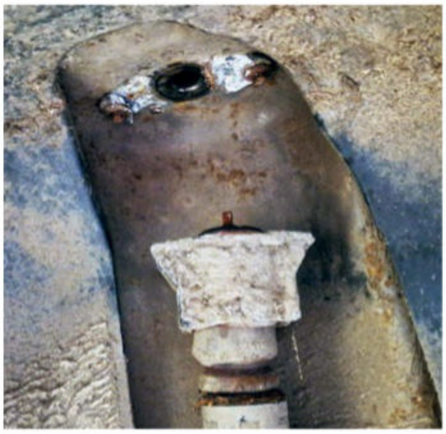
1970 Rover P6 3500 Older restoration, found in a garage in 2017. Long-distance classic.

1990 Volvo 240 estate Current *Classics World* magazine project car.

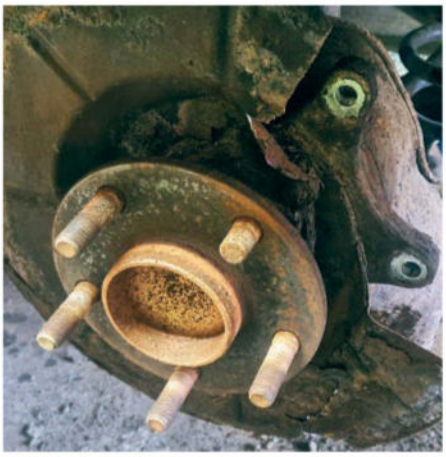
1992 Rover 827 Coupe Low-mileage original car with working aircon!

2011 Volvo C70 Coupe Peter's everyday car will eventually join classic fleet.

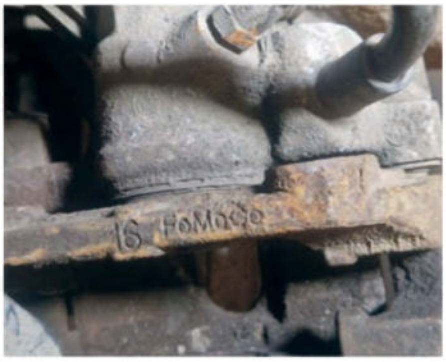
2014 Kia Sorento Family hack/truck that's always there and never lets us down.



The initial problem was a broken rear shock absorber mount. How common this is on C70s – and Ford Focuses which share the same platform – I've no idea, but it sounded pretty dramatic when it broke. I suppose it's fortunate that the mount broke rather than staying intact and ripping out part of the wheelarch.



Removing the wheel caused one of the wheel studs to break off, and the others didn't look to be in brilliant condition. Replacement studs don't seem to be available, so the whole wheel bearing assembly had to be renewed. Here it is with the caliper and brake disc removed.



Want proof that the C70 and Ford Focus share a platform and thus also steering, suspension and brakes? Well, how about FoMoCo on the rear calipers?

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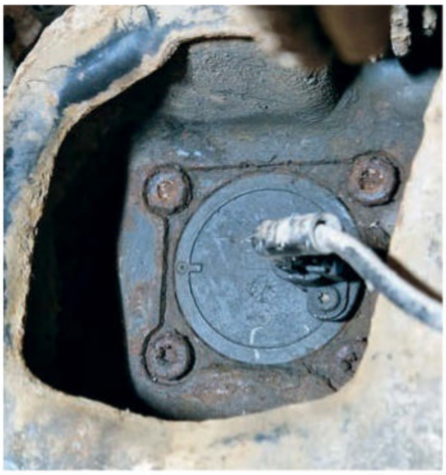
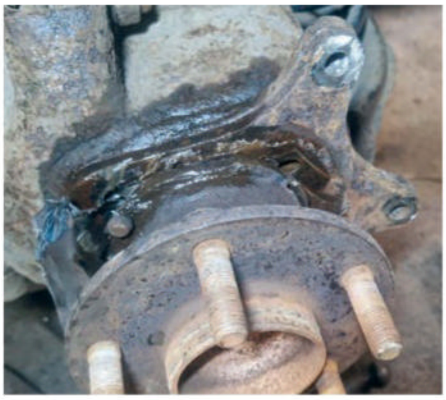


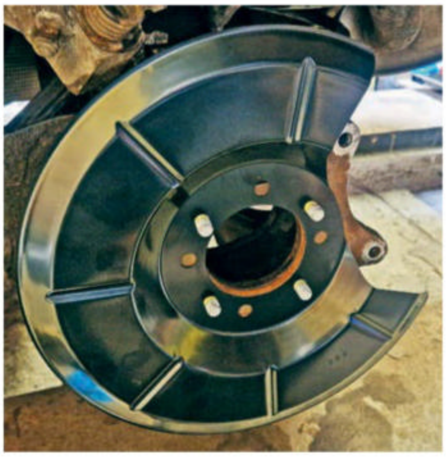
The bearing assembly is held on by four bolts with, frustratingly, Torx heads. Clearly there was no way these were going to come undone without a massive, massive struggle. The single wire is for the internal ABS sensor.



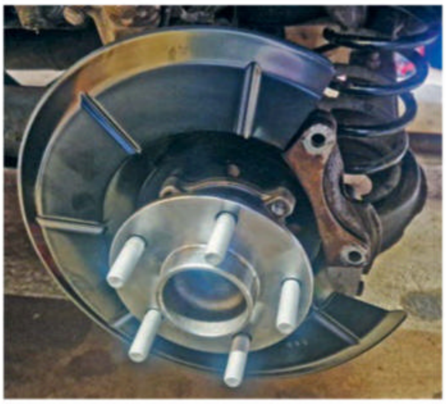
So it was a case of attacking the old bearing housing around the bolt holes with a grinder. Fortunately, the new bearing housing from febi comes with new bolts which do NOT require a Torx fitting. The brake backplate was really rusty, so I just snipped it off and fitted a new one on reassembly – it goes between the bearing housing and the axle/subframe.

The shock absorber mount bolts also needed attacking with a grinder to remove the remains of the mount. The shock absorber came out from underneath by undoing the bottom bolt. This was the only one to undo without a struggle!

◀ While everything was apart, I took advantage of the improved access to apply a decent and solid coat of Waxoyl to everywhere that was showing signs of surface corrosion, which was pretty-much everywhere! Loose rust and paint has to come off first, but it can go straight over solid rust. Further Waxoyl was applied right across the back, and to exposed metal straps and so on all the way down. Besides being protected, it looks a bit better under there too now.



The new backplate in place, prior to fitting the new bearing housing. New bolts here are essential even if, by some miracle, you are able to salvage the old ones.



Here's the febi bilstein new hub fitted. The four fixing bolts must be torqued to 48lb/f ft (65Nm). It's then a case of refitting the brake disc and caliper and checking it all functions correctly. I struggled a bit to get the caliper off at the start, until I realised that I'd left the handbrake on!

grinder, to cut through where the bolts screwed into the housing; a bit drastic perhaps but it was quick. I also had to take the grinder to the two parts of the shock absorber top mount that were still attached, as the bolt heads rounded off as soon as I tried to turn a socket on them. Fortunately, with the broken-off bits out of the way, the threaded sections if the bolts came out without too much difficulty. There were, however, a fair few other seized bolts on the way. In fact, the only bolt which didn't put up a struggle was the shock absorber bottom bolt.

They say that one seized bolt can turn a simple job into a major headache – I had to deal with no fewer than eight; even the caliper bolts were difficult.

While it was all apart, I made a point of rustproofing everything I could get to on both sides and down to the front of the car. I used Waxoyl – I know that other products are now available which some reckon are better, but I've used Waxoyl for something like 40 years, and have always found that it does, (quite literally) exactly what it says on the tin. Equally importantly, I had a tin of it on the shelf! Hopefully this will at least keep corrosion at bay.

With that done, the car was ready for its MOT? Unfortunately not! Checking the front-end revealed a split rubber on the nearside bottom balljoint, and corrosion of the joint behind. I had actually noticed a bit of creaking on the steering in recent weeks, but assumed it was just the top-rubbers being a tad dry; that's what it sounded like anyway. But it's not, and the bottom joint needs changing. In theory, this means changing the arm as well. As the C70 uses a Ford Focus platform, the suspension is basically the same, and we showed how to change the complete arm in our Focus project, back in the May 2025 issue. There is, though, a way of changing just the joint, and I'll show you how that's done next time.

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In my Humble Opinion

Mike Humble reflects on his time spent at a quite unique motoring museum.

A great British day out

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Just a handful of the 130+ collection at The Great British Car Journey.

▶ Sometimes, it's good to get out and enjoy yourself. Being lucky to be living in Sussex, the coast is just a short journey away. We tend not to bother with Brighton, it's just a bit too busy (think London by the sea) and way too expensive – parking your car for a day costs more than two arms and a leg. Blessed with the amazing recent weather, we've been getting out and about more. Eastbourne is our usual haunt (despite Ed Martyn living there (*pardon?*, **Ed**)). Some call it God's waiting room and over the recent decade, it's starting to get ever so slightly run down, shabby and busy (*more new builds in the area = more people = more traffic,* **Ed**) but nonetheless, there's less riff-raff than Brighton and there's some really nice cafes and restaurants scattered around the town centre.

Usually, if it's a car-related gig on a weekend, the missus will tend to stay at home – unless there's somewhere she can hide out of the way, read a book and quietly sip coffee.

I was recently involved in a motoring website-related event in the Derbyshire peak district at a lesser-known motoring museum called "The Great British Car Journey". Some of these smaller places can be hilariously rubbish. For example, there was a place in Stondon, Hertfordshire that got so run down prior to its closing, they almost started paying the public to come and visit. It wasn't all bad though, I ended up literally buying all their collection of old car brochures for a tenner, days before they closed for good.

Car museums always give me mixed emotions. On one hand I rejoice in the fact the cars are lovingly cared for and admired by all, not to mention the tireless work that goes on behind the scenes keeping them shipshape. On the other, I feel a little sad, rather like seeing a once loved family pet stuffed and put on display never again to run wild and free. That last emotion possibly stems from the fact that I'm the wrong side of fifty and vividly recall most of the exhibits parked up in every street and car park – with every good chance I've either owned or driven one. Even though I adore kit like Daimler's, Jaguar's and the Lotus Excel, my heart lies with motors like the good old Cavalier and Cortina – just two such vehicles that most of my late teenage motoring mischief took place in.

Anyway, I digress, I'd heard of this place in the peak district prior to my visit and after hearing some mixed reviews (most of them good to be fair) it was logged into my mind as one of those 'must visit this place one fine day' affairs. Well, the day came and even though there was a fair bit to sort out and organise (we had a former Rover manager as a guest speaker), there was time to meander around the exhibits on display. The accent on the collection is British-built in general and it was refreshing to see a lack of 'exotica'. Yes there was a Bentley coupe once owned by Elton John and a pretty looking Silver Shadow Roller but most of the cars on display are what we oldies call 'street furniture'. The kind of cars your dad would have owned if you are younger – or we'd own if, like me, an old geezer.

> *"For a reasonable fee you can relive the dream (or nightmare) or scratch an itch by driving one of the vehicles available"*

All the cars (over 130 of them) are placed in a timeline arrangement – you think of it and it's probably there – even a DMC DeLorean. The museum was the brainchild of Richard Usher and formally opened in 2021 on the site of a former engineering factory in Ambergate – itself a pretty old mill town and what makes this place quite unique is the fact that on top of the 130-odd vehicles on display, there's a collection of 30 or so cars you can actually drive around the site as they're all MOT'd and ready to roll. From a Rolls Royce Silver Spirit to a Marina Coupe 1.3, for a reasonable fee you can relive the dream (or nightmare) or scratch an itch by driving one of the vehicles available. Those visiting can also choose to use an interactive virtual host and there's plenty for the kids to enjoy too.

You'll even find an onsite cafeteria for when your feet are sore and there's a rumble in your tum and it's fast becoming a place for car clubs to have their annual meet-up events. If you are expecting something as glitzy and polished like the British Motor Museum at Gaydon then you may feel disappointed – but you'd be missing the point. Gaydon has been lucky enough to have had millions of pounds thrown at it and houses some lovely vehicles from the Jaguar Daimler Heritage Trust – and the backing of hundreds of benefactors, but the Great British Car Journey was born from the idea of one person and is run collectively by a small group of people. The atmosphere when you walk through the doors is one of love and affection – you can almost smell it in the air along with the aroma of engine oil and petrol.

As I have touched upon, it's quite a unique venue set in a peaceful part of the world. From Rootes to Reliant or even state-of-the-art hydrogen, thanks to Toyota and their donation of a Mirai, there's so much to see. For me though? Well, it was nice to see a splendid immaculate Cortina GL and a Sierra Sapphire twin-cam (owned plenty of them) and was given the treat of a spin round the block in the Sierra. The drive back home made me feel sad thinking I'll never have another parked on the driveway again. That said though, I reckon the missus is quite relieved at that last statement.

I recommend anyone to visit as it's a superb day out. More info at **www.greatbritishcarjourney.com**

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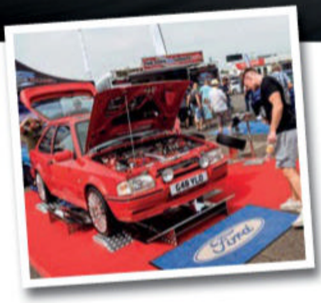

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